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EDITORIAL NOTES.

A Serious Warning to Gas and Water Companies.

THE more we look into the provisions of the London Water Bill, the less we like them—especially those relating to arbitration. Our readers generally are aware that, when property is taken for public purposes under compulsory powers, the usual way of settling the price to be paid for it is by an arbitration under the Lands Clauses Act; the principle of that Act, as developed in practice under various judicial decisions, being that the award of the arbitrator shall be based upon the value of the property—not to the person who takes it, but to the person from whom it is taken. This is the principle which has been satisfactorily applied in compulsory sales of property for upwards of half-a-century. It did not, however, suit the London County Council in their designs for acquiring the undertakings of the London Water Companies—for this reason: They had contemptuously rejected the findings of Lord Balfour's Commission in 1893 as to the sufficiency of the Thames as a source of supply; they had pledged themselves to go to Wales for any additional supply of water for London; and they foresaw that the carrying out of their scheme must necessarily entail a heavy burden upon the ratepayers, if the undertakings of the Water Companies were purchased by them and paid for upon the usual terms. In their view, consequently, the "value" of these undertakings came to mean just such a price as London would like to pay. Hence their extraordinary efforts in Parliament and elsewhere to obstruct and harass the Water Companies, in order to depreciate the undertakings; and hence, too, their ingenuity in inserting in their Purchase Bills an arbitration clause specially framed to suit their own purposes, coupled with that amazing provision under which the undertakings might be transferred to them before the price had been paid or even fixed.

What measure of encouragement this policy received from Parliament may be inferred from the following words used by a member of the Government (Mr. Chamberlain), when the Purchase Bills came up for second reading in 1896. He said: "I ask the honourable member for Shoreditch [Professor Stuart], and others representing the London County Council, whether they contend that it is their duty, representing the ratepayers, to get hold of this property at a price less than its fair value? That is not the duty of any representative body; and, that being so, they should be content to give the Companies what they ask"—namely, arbitration under the Lands Clauses Act. He also expressed the opinion that the terms demanded by the London County Council were "so exorbitant and unreasonable that they could not be conceded by the Government or the other interests concerned."

Early in 1900 came the report of Lord Llandaff's Commission, appointed by Lord Salisbury's Government to inquire into the subject of purchase. In this report, the question of arbitration is exhaustively dealt with. The Commissioners refer (par. 47) to the above-quoted expression of opinion by Mr. Chamberlain, with which they are "disposed to agree;" and then (par. 48) they go on to say: "We see nothing which leads us to suppose that, if these undertakings are compulsorily purchased for the public advantage, Parliament will sanction any exceptional provisions, or depart from the terms of arbitration usual where the property of private persons is taken from them against their will. We shall, therefore, assume that, if the policy of purchase is adopted, the price of the undertakings will be determined by an arbitration conducted on the lines of the Lands Clauses Act; although, possibly, in view of the magnitude of the undertakings, a different constitution of the tribunal may be adopted." We give the exact words of the report, in order to emphasize the remarks on this point contained in the article on "Water Affairs" last week.

And yet, in this Year of Grace 1902, the Government that had condemned the Bills of the London County Council, session after session, and that had before it the report of Lord Llandaff's Commission, has seen its way to introduce into Parliament a Purchase Bill containing the same objectionable arbitration clause, and the same inequitable provision for the transfer of the undertakings before payment, as were officially denounced by it in 1896. Had such a measure proceeded from a Radical Ministry, we could have understood it; but we fear that to many of the supporters of the present Government it will be a severe trial. "There is plunder in the air," as the late Lord Bramwell used to say; and it behoves every gas and water company in the United Kingdom to be on the alert, and to bring this Bill to the notice of Members of Parliament with the view of organizing a strong opposition to the second reading. It is manifest that, should the Bill pass in its present form, a very dangerous precedent—as we pointed out last week—will have been established in regard to the mode of acquiring property under compulsory powers.

Since the foregoing was written, Mr. Edmund Boulnois, the member for East Marylebone, who, as our readers are aware, is Chairman of the West Middlesex Water Company and of the Staines Reservoirs Joint Committee, has put a notice upon the paper of the House of Commons to move the rejection of the Government Bill on the motion for its second reading. It is based upon the view held by the honourable member that the proposed method of acquiring the undertakings of the Water Companies is novel and without precedent, especially in regard to the provision for taking over the property before the price is determined. We have already remarked that in several important particulars the Bill does not carry out the recommendations of Lord Llandaff's Commission. Mr. Boulnois goes farther. He considers the whole Bill to be in conflict with them. But beyond the sphere of the Water Companies the opinion is growing that the principles enunciated in the Bill are inimical to private interests, as we have endeavoured to show in the preceding observations. It has been announced that Mr. Remnant, the member for Holborn, intends to ask the President of the Local Government Board whether, seeing that the Commissioners, in their report, contemplated the probability of the existing water-rates being insufficient to meet the interest and sinking-fund charges involved in the purchase of the water undertakings, and that the Bill will empower the proposed Water Board to make good any deficiency out of the rates, and seeing, moreover—and this is the point which is of supreme importance to our readers—that the largest ratepayers include railway, dock, gas, and electric lighting companies, to say nothing of brewers and other traders who have provided their own water supply by means of wells, he will consider the expediency of affording some special protection for such ratepayers.

We have indicated what we consider to be the defects of Mr. Long's Bill, and we reproduce in another part of the "JOURNAL" an article fully setting forth the views of the "St. James's Gazette" thereon. In calling attention to these matters, we have done what we conceive to be our duty. It now rests with those whose interests are at stake to take such measures as they may consider best for their protection.

The South Metropolitan Meeting—A Programme of Reform.

THE South Metropolitan meeting on Wednesday was, as usual, rendered interesting by the Chairman, whose speeches on these occasions make instructive lectures on the contemporaneous state of the English gas industry in general. Mr. Livesey ran cursorily through the business of the ordinary meeting, having the subsequent Wharncliffe meeting to follow. He spoke first of the various reductions mentioned in the report—the reduced prices of coal and coke, and the reduced illuminating power of gas. He touched humorously on the pernicious effect of the arsenical beer scare of the North of England, in throwing upon the southern market all the surplus coke of the manufacturing towns, and spoke of reprisals. On a previous occasion, we

aroused Mr. Livesey's curiosity—not to use a stronger word—by describing him in Browning's words as "one who "was ever a fighter." We believe that all the time he had been cherishing the innocent delusion respecting himself that he is by temperament and by habit a man of peace! Well, there is no man living, not even among those whom he has fought and beaten, who does not hope that the day may be long distant when Mr. Livesey will find it time to complete the quotation by claiming only "one fight more." But what a showing he made, on Wednesday last, even for a man not accustomed to take untoward things "lying "down." He threw out the suggestion that he should be delighted to return to the Midlanders a trainload of coke for every one they despatched to town. He is ready to conclude a defensive alliance with anybody who is attacked for an alleged infringement of the Welsbach 1893 patent. He is quite prepared to carry war into the camp of the London Gas Referees. His scorn of the typical University professor as a gas examiner is as robust as it is outspoken. And, lastly, as it were "in the stride" of the Company's progress, he proposes to revolutionize the directorship system of administering British joint-stock enterprises.

That is a tolerably full year's programme, even for a man of Mr. Livesey's force of initiative and tireless energy in following up an objective. There is matter enough in Mr. Livesey's two speeches, the text of which will be found elsewhere, for a dozen articles appreciative or condemnatory. The speaker would probably prefer the latter; for he at any rate has never complained of criticism. For the present, however, we shall limit our comments to one point of the address with which the Chairman commended the Bill to the South Metropolitan proprietors. We shall do this, because nobody reading the parliamentary notice of the Bill itself would perceive the real bearing of the very ordinary proposals for increasing the remuneration of the Directors of the Company. As a matter of fact, that has happened in this respect which has happened before in the workings of that original mind. The first suggestion contained the potentiality of something far greater than was suspected at the time, even by its framer. As Mr. Livesey pondered the matter, the form of his opinions—not the judgments themselves—altered. He began merely with the thought that the fees of the Directors of the South Metropolitan Company, which had remained the same while the business had increased threefold, ought to be increased. Accordingly, the parliamentary notice was drafted to permit of this act of fairness. But, on thinking the matter over, Mr. Livesey was led to the conclusion that what is wanted, not merely for the South Metropolitan Company, but for all British joint-stock concerns in general, is new and improved administrative machinery.

Recent events vociferate the lesson that one of the weaknesses of the English joint-stock company system is the directorate. Measures for defining and increasing the responsibility of directors have been, and will continue to be, passed; but they are merely police and palliative regulations. The only way to eradicate the weakness is to diagnose its nature correctly, and then proceed to deal with it by pitiless logic. The secret, like most other great discoveries, is a perfectly open one to those who will not shut their eyes to it. It consists in the truth that, in the appointment of the directors of a company, knowledge of the business of the concern is about the last qualification thought of by anybody implicated. We have discussed this question several times, and asked that the familiar term "directors' qualification" should be read in more than the narrow financial sense which has become attached to it in joint-stock company phraseology. Once let it be understood in the proper quarters that directors must possess more than the statutory "qualification" for their office, and then the first long stride will have been taken towards the attainment of that "efficiency" in British manufacturing industry which it is the current fashion to pretend to desire.

Mr. Livesey's idea is, in brief, that after his time the superior control of the South Metropolitan Gas Company ought to be in the hands of a President, according to the American model, who should be the real, as well as the titular, head of the undertaking. He would be a man in the prime of life, a master of gas making, and a good man of affairs. He would be paid an adequate salary, would possess the usual holding of a director, but would devote the greater part of his time to the duties of his position. In other words, he would be the regular exponent of much the same kind of control as Mr. Livesey himself has exercised —albeit in an irregular way—over the South Metropolitan affairs ever since his father's time. One sees the net result in the actual position of the Company. Clever and devoted as Mr. Livesey is, however, he would confess that he could not have done as he has, if he had not been a thoroughly grounded and trained gas engineer. That is the *crux* of the matter. As we maintained recently, and were called to account by a correspondent for so doing, a gas undertaking does best when its head is an engineer. Here is the leading instance in proof. It does not follow, however, that the executive engineer should be that head. Where the concern is big enough, the head will want his engineering aids as well as his clerical staff and his legal adviser. But if he is himself an engineer, he will not be at the mercy of his technical assistants for those manufacturing and industrial counsels upon the wisdom of which the prosperity of the undertaking mainly depends. If, as the familiar saying has it, dividends are made in the retort-house, the head of the business should clearly not be a stranger to that part of the establishment.

The reform that Mr. Livesey desires for the South Metropolitan Gas Company, as usual with his remedies, goes to the root of the evil. The directorial system wants adjustment to the requirements of many businesses, of which the gas industry is but one. The ordinary "guinea-pig" kind of director was always useless, and he has become an obstruction to be removed. Call them what we like, directors ought to be capable of directing something, which at present they too commonly are not. In some departments of English enterprise, sheer necessity has already applied the remedy. Thus it is generally understood that the chairman, at any rate, of a bank, is a gentleman who knows something about banking. Glance at the newspaper reports of the meetings of some finance companies, and the speeches of the chairmen will convince the least adept that they know what they are talking about. The head of Whiteley's emporium is, as all the world knows, a draper by trade; and his successor will probably be just such another. How painfully different it is with most gas companies, and also railway companies. The incapacity of the ordinary railway director is the theme of much complaint at the present day. And as for gas directorships, they are nowhere paid on the scale necessary to secure really able administrators; while the fees are just high enough to attract a useless contingent, mainly of men who have retired from business, or who never had any business of their own to do. We well know what the briefless barristers and the retired colonels did for the "Co-operative Stores" started in London some thirty years ago. The sooner British industry at large sheds parasites of this order, the better will it be able to meet abroad its intelligently directed rivals, and at home the inflation of municipal trading—the latter being subjected to very much the same class of controllers.

The Sons of Engineering and of the Gas Industry.

THE more one is brought into contact with the organized work that is being done among engineering students, the deeper becomes the obligation to recognize its importance, and to render to the movement all the aid in one's power as an organ of the profession through which its intelligence is being communicated. The necessity for affording opportunity for improvement to the engineering student outside the office, and the restricted and frequently rut-marked works in which he has been cast, has been long since established; and, with the flight of the last few years, the small wave of endeavour which was set rolling in this direction has gained in swell and momentum, until now those who hold the highest placed laurels in the profession cannot resist its impact, and gladly countenance by patronage, presence, and influence well-grounded efforts on behalf of their young colleagues, whether filial or otherwise to the great institutions. Eminent contractors and owners of engineering establishments also now run side by side with the distinguished engineer, and hold out a welcoming and aiding hand to those upon whom the duty will fall of carrying forward the great work which they themselves now perform and bear. Their works—manufacturing and constructional —are to-day thrown open with a largeness of mind which was unheard of not many years since.

Thus the engineering student, who once was, as it were, instratified between the notions of one set of superiors and methods of work honoured by long usage in the establishment in which he found himself, has now the opportunities,

if only he will firmly grasp them, for having his faculties stimulated by rubbing shoulder to shoulder with those who have been far more laboriously, but still patiently, perseveringly, and successfully, treading the road before him; by being brought face to face with methods, the product of many minds; and by having freely given to him the best of all improving instruction—the inspection of engineering structures during their building. Finished work may be good to look at, and marvellous in its impression; but to be able to anatomize the structure in its nakedness and incompleteness is an invaluable lesson for intelligent and industrious students.

During the last fifty years—aye, during the last ten years, the work of the engineering world has grown with a surprising rush; but the work has been met by capable brains and hands. The prospects before the engineering world are infinite; and more brains and more hands will be needed. The last few years' wave of encouragement to the young men of the profession already bears its ornamental crest; and on the great works now proceeding may be found many whose dignified positions could be traced to the greater opportunities for free intercourse with eminent character and work given them by the distinguished organizations of the country. The good work must continue. Brains fertile in conception, management, and execution, will be needed more and more; and such brains can be best obtained by great and varied experiences while the mind is young and receptive, and before the responsibilities of life have any great weight.

The Institution of Civil Engineers, through their students' division, years ago opened the door of the engineering world to a wider range of recruits; and this is as it should be. There are some who would have, in the engineering profession (speaking generally), and in other professions too, the anks preserved and consecrated to a class. But it is comforting, looking to the future, that these are in a minority. The greater the field of opportunity, the better. The best talent is what is wanted. With the opportunities now offered in most branches of engineering, that which is best will assert itself; and the proved talent will keep the flock of incompetents from blocking the door. By means of papers and lectures, and meetings and works visits, the students are brought into contact with the leaders of the profession; and, by papers and examination, the students are able to give proof of their own competence in the amassing and assimilation of information, and in evolving from it new ideas. Careful adjudging of their work, places the rewards; and the students' competence and ability are made known at the meetings of the senior body at which the awards are made. Public recognition of this kind is encouraging, and has the advantage of frequently aiding the advancement of a deserving and promising but hitherto unknown youth.

What the chief Institution are doing in this work of encouraging the aspirants for engineering position and dignity, the Institution of Mechanical Engineers are also doing by means of their graduates' section; and its importance was forced upon us by attendance at the meeting of the graduates yesterday week. The lecture theatre was fairly well filled with young men. In the chair was Dr. A. B. W. Kennedy, honoured among men for years of distinguished study and work. On the eminent Chairman's left-hand side was one of the graduates; and on his right Professor T. Hudson Beare, F.R.S.E., Regius Professor of Engineering in Edinburgh University. Professor Beare lectured on "The "Developments in the Gas-Engine," making his comparisons with the time of Dr. Kennedy's Society of Arts tests, and illustrating his points with lantern views. The graduates were interested and appreciative; and who can say what may in future arise, and what benefits may accrue to industrial economy, from that plain talk on a subject of vast importance to-day in the world of mechanics? The last words of Dr. Kennedy at the meeting announced that the graduates would visit the South Metropolitan Gas-Works at East Greenwich on the following Saturday.

This announcement set us thinking; and the question naturally suggested itself, What are the Institution of Gas Engineers and the Gas Institute doing in the way of specially encouraging the young men who have entered the lists intent with the idea of taking an official part before long in the great work of the gas industry. The answer can be summed up in the words "absolutely nothing." The numerous journeys taken in recording the doings of the gas industry brings us into contact with most of its official men; but the youths and the young men—the future gas officials!—where are they, why are they seldom seen, and why are they not given the opportunity, under the fostering care of one of the head Institutions, of being heard? We meet these coming engineers on the works where they have been deposited for training; but their training does not include—as in other branches of engineering—the opportunity for the development of ideas by organized meetings, lectures, and visits to establishments of equal or greater note than those in which they are immured. Why is this? We cannot divine. It is all nonsense saying that gas-works are so scattered that organized meetings and trips of the students of the profession could not be arranged. They could be arranged if the chiefs willed. There is no difficulty in getting together a meeting of gas engineers; and most gas engineers have one or more assistants and pupils. We are told by a great authority on gas matters that the next few years bid fair to be among the most critical the gas industry has experienced. To the full, we sincerely believe this; and to meet these times, those who lead the gas industry must have at their backs a sustaining force of young and vigorous men, whose intellects have been quickened and expanded by opportunities which only those above them can open up to them. The Institution of Gas Engineers and the Gas Institute have not the power of the Civil Engineers or the Mechanicals; but they hold in their hands the power of doing something for the young men of the industry. May that "something" be their very best. The times press; the needs of the industry demand.

The Government Patent Law Amendment Bill.

It will be generally known by our readers that the promised Government Bill to amend the Patents Act, 1883, has been read a first time in the House of Commons. We give elsewhere an abstract of the contents of this important measure, which, if passed as it stands, will make great differences, both to applicants for patents and to everybody interested in patents which have reached the stage of possessing any commercial value. The Bill thus touches patents *in nubibus*, and also when they are in the full flowing tide of industrial application. Although we have never taken the extreme view of the importance of a patent system, as a fount and origin of national industrial enterprise, which is popularly held in the United States, yet the importance of a good patent system as a factor in encouraging the advancement of the arts and crafts of a country is not to be gainsaid. All technical students know that the patents related to an industry constitute the best indication of the trend of endeavour in that industry. They manifest what the best and the most active minds—not always equivalent terms—are thinking of; and, of course, they also mirror those passing fashions of enterprise and speculation which, like other kinds of fashions, are so powerful over men's habits while they endure.

It has been our practice to uphold the English patent system as being, on the whole, the best in existence, having regard to the reasonable requirements of the public and of inventors. As regards the conduct of the Office itself, there can be no two opinions in regard to the efficiency and urbanity of the official staff, from the Comptroller down to the doorkeeper at the admirable Library. At the same time, up to now the Patent Law has been open to suggested amendment in certain particulars, and will probably ever continue to be so. The great point is that the Board of Trade, the supervising Governmen Department, is the most accessible of the Departments of State, and is always willing to listen to such suggestions, and to act upon those commanding a sufficient backing of intelligent and informed opinion. Now, it has never been our belief that an inventor has a right to expect the Government to add anything to the intrinsic value of his proposals. If they are examined, many of the commonest complaints now raised against the English Patent Office are based upon the contrary expectation. Patentees, mostly, if not all, belonging to the "snap-shot" variety of the order—those who hope to make a sudden fortune by patenting some happy idea in connection with a subject of which they know absolutely nothing—argue as if the Office, in return for a small fee, ought to tell them all they do not know about the business in hand. This is ridiculous. On the other hand, a most deserving order of applicants for the protection of a patent are those who, while they possess a good general knowledge of their subject, and are superior to "wild cat" suggestions, do not know what anticipations exist in the archives of the Office itself,

This knowledge is just the additional boon which the Bill proposes to give applicants for the small surcharge of £1, payable only if he elects to go on. It is extremely cheap at the price.

The other half of the Bill relates to the vexed subject of compulsory licences; and the main point is that the jurisdiction in this respect is to be transferred from the Board of Trade to the Courts. The ground of all such applications is to be, simply, the public interest. Patents are granted, not that the public shall suffer from the creation of a monopoly, but in order that the public shall derive benefit from the operation of individual ingenuity and enterprise, duly rewarded. The inventor is invited to disclose his invention, so that after he has received his reasonable remuneration from its exclusive exploitation during the prescribed term, it may be open to the whole world. There has been a tendency of late years on the part of some Judges to lose sight of the rights of the public to reasonable treatment by the inventor during his patent right; and this point has never yet been disposed of by the highest Courts. Henceforward, if the Bill passes, this doubt as to the extent of patentees' rights will be removed by the grant of an equal right to anybody to move the Court to compel patentees to satisfy the reasonable demands of the public. The voluntary relinquishment by the Board of Trade of the jurisdiction in this regard conferred upon them by the Act of 1883 is a high testimony to the superior merits of the older Themis when it is a question of touching the rights of the subject.

Foreign Competition and the Labour Difficulty.

THE question of whether the competition of American with British coal in neutral markets will in the future be a serious or a negligible factor in determining the price of coal in this country, is being vigorously canvassed at the present moment in South Wales. The men's leaders wish, as in other trades they have always tried, to "pooh-pooh" the idea of foreign competition being a serious matter wherewith to contend. They prefer that the public should believe that it is only a "bogey" raised by the employers to frighten them into accepting lower rates of wages; and they never will recognize the reality of the competition until the trade has been taken away and they are left to whistle for work. This has been seen only too plainly in the engineering trades in the past; and, judging by the result of the ballot on the new agreement offered to the men by the Engineering Employers' Federation, the men, like the Bourbons, have learned nothing and forgotten nothing. All the discussion that has taken place in the Press as to the danger threatened to our trade by the hindrances imposed by Trade Unionism has apparently left the men untouched. They have rejected the proffered agreement by two to one; partly because it stipulated that the Trade Unions should not permit, on the part of their members, any interference whatever with non-Union men, nor countenance any objection to working with them, and partly because of the terms giving the employers discretion respecting machines and apprentices. Fortunately, the vote was only a small one, and may be upset after the matter has been further discussed; but the result of the negotiations so far is not encouraging.

Foreign competition is, however (whatever the men may think or say), not to be ignored. Various statistics recently published give proof of this, and of the fact that high prices stifle trade. Last year, France only found use for some 12¼ million tons, instead of, as in 1900, 13 millions, of foreign coal; but it was in the purchases of dear British coal that the reduction took place. Belgium and Germany maintained their trade within 40,000 tons; the United States sent 47,000 tons as against *nil* in 1900; and Great Britain sent 476,000 tons less than the previous year. This does not look as if we could ignore competition. The figures relating to the coal imported into Germany in 1901 show the same result, or rather an increase in the consumption of German and a decrease in the consumption of British coal. Last month's returns continue the story; 14,100 tons less of British coal sent to Hamburg, 6200 tons of American coal against *nil*, and 6200 tons more of Westphalian. In other words, 10 per cent. of our trade passed to our competitors. The returns of the year's exports of iron and steel from Germany likewise show that foreign competition is no bogey of the imagination. While our exports were steadily falling off, those from Germany increased as follows, comparing 1901 with 1900, in thousands of tons: To Great Britain, 454 against 154; to Canada, 30 against 3; to India, 95 against 27; and to Australia and the Cape, 48 against 40—a total of 627,000 tons, compared with 224,000 tons to markets that we might well regard as peculiarly our own. Altogether, Germany exported 780,000 tons more iron and steel last year; while we exported 640,000 tons less. Yet foreign competition is only a bogey, and the men propose to continue restricting output, and interfering with works management as before. 'Tis a sad pity; and the conversion of the men to wiser views is no easy task. But it must be undertaken by the employers, if they do not wish to pay the penalty.

The Progressive Principles of the London County Council.

WHAT a bone is to a dog, that is a "principle" to your latter-day Philosophic Radical, who dubs himself "Pro-"gressive" in municipal politics. On the origin, sanction, and meaning of this kind of "principle" it would be vain to seek for exact information. Any man can dub himself a Progressive, without being called upon to specify what he means by it, even if he should happen to know, which is not likely. In the same way, a Progressive's "principles" are without father or mother, age or descent. They relate to all sorts of things. "Municipalism" itself ranks as a "prin-"ciple;" and it has periodicals devoted to its inculcation. Next come "Municipal Trading," and "The Direct Em-"ployment of Labour"—principles of the highest rank, so high, indeed, as to be above everything like experimental tests. But, just as the exact degree of savouriness or meatiness of his bone does not affect the intensity of the dog's feelings in regard to this treasure, so the merit or expediency of his "principle" has nothing to do with the tenacity with which a member of the London County Council will stick to it. There is that question—we beg pardon, that "principle," for, of course, it is not in question—of "direct employment." Ever since somebody unknown wrote to "The Times" to denounce the calculated laziness of Society bricklayers, and to let the world know that, while bricklayers employed by a private master will still consent to lay 400 bricks a day, they will not exceed 330 bricks a day for the London County Council, there has been great perturbation among the Progressives of this body. At first, Lord Welby, the Chairman of the Finance Committee of the Council, tried to disparage the accusation by referring to the anonymity of the writer. They do not like critics at Spring Gardens any more than they do at the Horseferry Road; and at both places the word "irresponsible" trembles on the lips of the official apologist who has to notice the remarks of pestilential persons of this order. Nevertheless, Lord Welby, who holds on to one end of the "principle" of direct employment, while Alderman Taylor, Mr. John Burns, and Mr. Macdonald mumble the other, was fain to promise an inquiry into the truth of the aspersion on the noble Trade Unionist bricklayers in the pay of the Council. It was understood that the inquiry would be searching and impartial.

Alas! for poor Truth, when she attempts to take a bone from a dog! Lord Welby, on Tuesday last, produced his promised report. It was a lame performance. The accusation was, that the Council's bricklayers had declared the laying of 330 bricks to be a fair day's work. Lord Welby feebly remarks: "If this passage means that the Council *has* "*accepted* 330 bricks as a fair day's work, that statement is "not correct." But the statement was not as to what the Council accepted, but what the bricklayers did; and Lord Welby's query constitutes an evasion. It appears further on that Lord Welby cannot ascertain what the bricklayers actually do. Not all the officers and men in the employ of the Council could help his Progressive Lordship to an exact knowledge of the number of bricks a man lays in a day! "Although we have given the matter our careful attention, "the difficulty of obtaining accurate and comparable data "has prevented us from arriving at any definite con-"clusion upon the point." And this is the body which is prepared to "do for" London generally, supplying some millions of pounds' worth of water, electricity, tramways, and goodness only knows what besides. In future, the question: "How many bricks can a man lay in a "day?" ought to floor a Progressive candidate for election to the County Council, as completely as the physical half-brick when used for picketing purposes. It seems hardly worth while to further prick the bubble of "direct employ-"ment" by offering, as a War Office contractor has done, to do the work of the County Council's Works Department at a discount of 18½ per cent. upon its own scheduled prices.

This matters nothing, being a point of fact and of experience. The "principle" remains superior to all such considerations; and the principle of municipal trading is that a municipality can do everything better, cheaper, and more satisfactorily in every way than private enterprise. Ordinary people are accustomed to hold that "the proof of the pudding is in the "eating;" but that is a sadly un-Progressive view. Principles must be swallowed whole—an American satirist said that politicians are mercifully made hollow for the purpose. They are not used for the kind of pudding that is eaten, and reputed according to results.

Preparing for the Welsbach Test Action.

For the third time within eight days, Mr. George Livesey (at the Crystal Palace Gas Company's meeting) publicly spoke of his guarantee fund scheme for ensuring that there shall be an adequate contest over the Welsbach 1893 patent. Some people seem to see in the proposal a trace of animosity towards the Welsbach Company. There is nothing of the kind. No one could have recognized in more honest language than the projector of the fund the value that the Welsbach mantle has been to the gas suppliers of this country, and no one could have proclaimed in plainer words than he that his only desire is to reduce a state of uncertainty to one of certainty by the best means available. A battle only half fought, if won by the Welsbach Company, would leave the country in this matter in almost as disturbed a condition as at present. The point should be made quite plain that the gas industry has a greater interest—a financial interest to put it openly—in the issue of the test action than either the Welsbach Company or the defending manufacturers of competing mantles. At the same time, if the Company can prove their legal right to the retention for the next few years of a monopoly in the supply of mantles in this country, the gas industry will cheerfully bow to it. It is true the Company are pledged to reduce the price of their mantles as soon as the new administration are settled in power; but no one can expect that during the continuance of a monopoly that the price of mantles in this country will come down to the level of the charges in all other countries where there is free trading. Directly Mr. Livesey broached his scheme, there was a warning against such illegalities as "maintenance" and "barratry;" and no doubt many legal works have in the past week been consulted to see what is the real interpretation of such violations of the law. Yet the author of the proposal pushes forward; and one after the other, the Companies in the management of which he is concerned have provided the nucleus of the guarantee fund. Eight days having passed between the Crystal Palace meeting and the first public announcement on the matter, no one can suspect that Mr. Livesey is pursuing his object in the dark, or without legal guidance. We shall see. Meanwhile, his words and actions are extremely interesting. He refuses to pronounce an opinion one way or the other on the question of the validity of the Welsbach patent. Yet it is stated, in public meeting, that in South London he uses cheaper mantles than those which are distributed from Westminster. Well, it is true that actions sometimes speak louder than words.

The Institution of Gas Engineers.

Including the President (Mr. W. R. Herring), there were nine members of the Institution of Gas Engineers—mostly councillors—present at the annual meeting last Saturday. Of course, the smallness of the attendance is accounted for by the fact that the proceedings, as is customary at this February gathering, were only formal; and, after a very few minutes, they were adjourned until April 30. Nevertheless the arrangement is a curious one. Only the officers and new members and associates were elected. Mr. Thomas Holgate, of Halifax, ascends from the vice-chair to the presidency; and Mr. Harry E. Jones is to be the Vice-President. Shortly after the meeting, members of the Council of the Gas Institute were also in Victoria Street. If the two bodies will only hurry up and settle their differences, the member for Stepney, as one of the representative seniors of the gas profession, would supply a united meeting of gas engineers in 1902 with a very fit President.

Wear and Tear and Income-Tax Assessment.

We are indebted to Mr. Henry Tobey, of Malton (a letter from whom appears in our "Correspondence" columns to-day), for details of a fight which he has waged with the Income-Tax Commissioners on the vexed question of allowances for wear and tear of gas companies' plant in assessing for income-tax. Last October, Mr. Tobey wrote saying that the local Surveyor of Taxes had disallowed his Company's claim for a yearly allowance on the larger and more expensive portions of the plant (which cannot be maintained in a state of efficiency by repairs and renewals each year), over and above the amounts charged in the revenue account for repairs. Under these circumstances, the Directors decided to appeal to the Commissioners for Special Purposes. This they did, with the result that the Commissioners say that if the Company wish for a yearly allowance they can have it so. It would, however, have to apply to the whole of the plant, and not to part only; and nothing beyond this yearly allowance would be permitted to be debited to revenue account—it would take the place of the items now appearing as "repairs and renewals" in any shape or form. On the Commissioners hinting that the yearly allowance would amount only to a nominal sum, and that as far as they knew there was no appeal from their decision, Mr. Tobey concluded that it would not benefit his Company to pursue the claim for such an allowance on gasholders, purifiers, mains, &c., in addition to the amount which is already allowed in the revenue account. With regard to the statement that some gas-works have a yearly allowance made to them for depreciation of gasholders, the Commissioners said that this must have been done in ignorance, and would be vetoed if the matter came before them. Mr. Tobey is to be congratulated upon the successful effort he has made to get a knotty point settled; and it is much to be regretted that the victory he has won is of such a character that he does not think it advisable to take advantage of the ground which the "enemy" have conceded to him.

Maintenance of Incandescent Mantles.

The Crystal Palace Gas Company on the initiative of their Engineer, Mr. S. Y. Shoubridge, are going to give a trial to a new system of incandescent burner maintenance. The idea is that the Company shall undertake to clean and keep burners in order for the nominal fee of 3d. each per quarter; the consumer paying in addition for the mantles required. There is something very fair to both consumer and Company about this plan; and it will give the consumer an interest, and yet no trouble, in seeing that the lights are not subjected to rough usage. But whether it will answer, no one, not even Mr. Shoubridge, is prepared to say. Mr. Livesey thinks that theoretically the plan is right; but he is doubtful whether it will be successful in practice. The experience of Mr. H. E. Jones has convinced him that the consumer prefers to know the ultimate amount that he has to pay for these things, and that therefore a charge including the supply of mantles is preferable. Gas managers will be interested in hearing the result of Mr. Shoubridge's trial. If it does not succeed, then he will pass on to the full length of maintenance. But why not at once adopt the two systems; and let the consumers take their choice?

A Double Supply of Gas.

It is not often that shareholders of gas companies are treated to a little technical lecture at their meetings; but Mr. Bryan Donkin, at the meeting of the Crystal Palace Gas Company on Friday, made a change in the established order of things. He instructed the proprietors on the questions of power gas and gas-engines. In Mr. Donkin's view, the gas-works of the future will have to send out two qualities of gas—a poor for motive-power purposes, and a richer quality for lighting, cooking, and heating. He does not suggest that the two should be distributed all over the district of supply. Only the richer quality of gas would be allowed to rove throughout the present system; the poor quality would be provided with its own distribution plant, and be confined to a district immediately surrounding the works. He thinks that the gas-works producing water gas should make a start very soon in this direction, by supplying within a certain circle uncarburetted water gas. With a cheap and plentiful supply of power gas at command, manufacturers would be induced to settle in the favoured district; and Mr. Donkin pictures the gas-works of the future as the centre of a veritable Eldorado of industrial wealth and activity. But Mr. Livesey quickly dropped cold water on the

idea by stating that, in his view, with the rapid spread of the adoption of incandescent mantles, a poor quality gas would be all that would be necessary in the future throughout any gas-supply district; and in this opinion he does not stand alone.

Is a Stove a Gas-Fitting?

The Malvern Magistrates say it is not. On being applied to by the District Council for a summons to recover an amount due for the hire of a gas-cooker, they at first refused to grant it on the ground that a cooker "being "used for its heat after the gas was consumed, was not "a fitting within the meaning of the Gas-Works Clauses "Act." On a second application being made to them, however, they changed their minds, and decided to grant the summons asked for. While we can admire the ingenuity of their interpretation of the Act, we cannot say as much for its soundness. It is more than fifteen years since the Court of Appeal unanimously decided, in the case of the *Gaslight and Coke Company v. Hardy*, that the words "any fittings for "the gas," in section 14 of the Gas-Works Clauses Act of 1847, included gas-cookers. Though so long a period has since elapsed, it is evident that at the time the original application for a summons was made to them, the Malvern Bench had no knowledge of the existence of this judgment; and we mention the matter here in case there may be Magistrates in other parts of the country who are in like case. The decision was such an important one to gas-supplying authorities, that it seems hardly likely they would lose sight of it.

Development of the Gas-Engine.

The lecture which Professor T. Hudson Beare delivered yesterday week before the graduates of the Institution of Mechanical Engineers illustrated, as clear and compactly as has any contribution to the subject of gas-engines, how rapid has been the march of events in that particular field of mechanical work. The lecturer showed, in brief, how the improvement of gas-engines enabled the use of a cheaper gas than formerly, how systems were soon evolved for economically producing the cheaper gas, and how the progress in this direction had made possible the manufacture and use of larger engines. Dr. Kennedy was in the chair; and his presence and words reminded us of his work on gas-engines of years ago. In those days, engines of 16 and 20 horse power were accounted as of considerable size; and the Doctor used to try to goad the makers into producing larger and better engines. But for his pains he got more or less snubbed. He forgives those who mildly reviled him in those days, and puts their want of sympathy down to the belief that, in their view, the day had not then arrived for making engines of considerably larger power. The makers preferred waiting for means for economically working the engines, than providing engines on the chance of the means coming along afterwards. But with the means of working at hand, suitable gas-engines have not been long in following. Now 400, 600, and 1000 horse power gas-engines are freely talked about; and engines of even higher power are spoken of in the technical papers and before the learned societies. It is pleasant to think of the opening up of a large industry of this kind of a distinctly mechanical character, and in direct development of one of the successful industries (in a smaller line of work) in this country. Our only regret is that, with the growth of the gas-engine, the coal-gas industry is to some extent being eclipsed as a means of power in its own particular field. But with the lowering of the illuminating power of gas, and the consequent cheapening of the supply, the industry will, there is little fear, maintain, and still extend, its motive power service. Even now for moderate powers, it cannot be beaten; but for larger industrial uses competition presses. Modern changes, however, in the other uses of gas are enabling the suppliers to shape themselves for stepping into the outer part of the field of which they once held unchallenged the inner portion.

What are Municipal Assets?

A member of the Devonport Town Council has suggested an interesting subject of controversy on the question: When is a municipal asset not an asset? He finds that credit is taken in municipal accounts for a number of things which produce no revenue, yield no profit in the monetary sense, and are not saleable. As examples, he mentioned the public parks and a monument which Devonport, in a moment of jubilation, erected in commemoration of the granting of its Charter of Incorporation. These things cost money, and they exist. The parks would have considerable value if they could be cut up into building sites, and even the stone of the monument would be worth something if it were pulled down and carted away to mend the roads. Still nothing is made out of them; and as it is not intended to convert them into money, there is clearly something to be said for the contention that these assets which have no commercial value should not be brought into the municipal balance-sheet. The principle might, however, be carried to still greater lengths. If pleasure-grounds and statues are not assets, neither are sewers and pavements, and most other things which come within the limits of legitimate municipal expenditure. In a commercial sense, they cannot be valued because they are not revenue producing and are not saleable. Yet they clearly have a value in the relation which they have to the health, comfort, and prosperity of the community. They stand in a class distinct from gas and water works and other trading concerns; and it seems to be a mistake to treat them on the same basis as these revenue-producing undertakings. Municipal accountancy is, however, a fearful and wonderful thing; and the method has yet to be invented by which the unsaleable non-profit yielding possessions of a town can be brought into the municipal balance-sheet without appearing in the false light of commercial assets.

Local Exhibitions and Interviewing.

The local exhibition season is approaching; and this reminds us that this method of trying to draw new custom does not appear to be quite so much favoured as formerly. This may be due to the fact that, after exhibitions of the kind have been held once or twice in a town, people tire of them; and it requires a good deal of the beating of the big drum, and entertainment of an order quite unconnected with the primary object of the show, to get anything like an attendance. Besides which, in some towns, the makers of gas fires and stoves are found—perhaps through pressure of competition and to create a demand for their own particular wares—to keep up a succession of exhibitions. In such places, the public must be positively sick of seeing gas exhibitions advertised. Therefore, a little rest now may do good; and then a year or two hence the exhibition may again be the means of profitably reviving interest. There is not now, it must be granted, the same necessity as formerly for the exhibition and its accompanying cookery demonstration. We talked of educating the public a few years ago, and removing prejudice against food cooked in the gas-stove. The public have been educated, to the advantage of the gas undertakings; and who now hears anything about prejudice? This being so, the original necessity for the local exhibition and series of cookery demonstrations has been removed. They have unquestionably done good work in producing a large number of users of gas cookers, and in spreading information as to their advantages. But we take it that, for a time at any rate, their work is exhausted; and now that work should be followed up by new methods. The public and gas consumers do not to-day flock to the exhibition, and so the gas suppliers must go to the public. The most likely line of action seems to be the new one of introducing an interviewer to pay personal house-to-house visits. Experiment in this direction in some towns has brought satisfactory success. Care, of course, must be taken in the selection of interviewers of good address and character, and diligent. It would be interesting to hear of the experience of gas suppliers who have directly taken up a house-to-house visitation for new custom.

Mr. Frederick Grover recently delivered a lecture at the Keighley Mechanics' Institute on the subject of "Gas-Engines." In the discussion which followed, Mr. C. H. Dewhirst remarked that there seemed to be a general impression in Keighley that gas-engines had had their day. His opinion was that they were just coming forward. When the fad of electric motors had had its innings, gas-engines would come to the front again. At Bolton, he understood that they were taking out electric motors, and putting in gas-engines. Electric motors were all right until the first power bill came in at the quarter's end; then it was "all off." Mr. J. Baldwin claimed that steam-engines were more economical than gas-engines; and he asked Mr. Dewhirst to take note of their relative positions in the market. Mr. Dewhirst replied that the "Otto" patents only expired about ten years ago; and gas-engines were therefore merely in their infancy yet.

WATER AFFAIRS.

Opposition to the Government Bill.

In criticizing last week the Bill introduced by the President of the Local Government Board for settling the London Water Question, we expressed the opinion that, in departing from the well-established custom of arbitration under the Lands Clauses Act to settle the value of the properties to be acquired, the Government had given the Water Companies just ground for dissatisfaction; and it was submitted that the embodiment in an Act of Parliament of such a principle as that contained in the Bill would be to lay down a precedent which might prove dangerous. We had in view at the moment the compulsory acquisition of the undertakings of the London Water Companies; but, of course, the principle would be of much wider application. It is, however, unnecessary to deal here with that aspect of the question, as this has already been done in a preceding column. It may nevertheless be mentioned that, by a curious falling together of circumstances, this rejection of the principle of the Lands Clauses Consolidation Act was adduced by Mr. Long's predecessor at the Local Government Board—Mr. Henry Chaplin—as a reason for opposing, in 1896, the second reading of the London County Council's Bill; and the Council accordingly now regard this as an abandonment of the position then taken up, and an acknowledgment of the justice of their contention. On another matter, too—their persistent objection to the usual 10 per cent. allowance—the Council claim to have gained a victory. These triumphs are not, however, sufficient to secure the Council's friendliness to the Bill. On the contrary, the Progressives intend to oppose it tooth and nail. This was evident from the proceedings at the meeting on Tuesday, when the four resolutions submitted by the Water Committee, and given in the "Journal" last week, were adopted. Mr. Clarke, who represents the City of London, and is a highly respected member of the Council, endeavoured to get his fellow-councillors to welcome the Bill as affording "a reasonable basis for the settlement of a "difficult question;" but the amendment he moved to give expression to this feeling was received with derisive laughter, and, in the result, it was rejected by a majority of 58.

The objections of the County Council to the Government Bill are very clearly stated in the resolutions above referred to; and they were voiced with much emphasis at the "protest" meeting held in St. James's Hall last night. In the first place, the Council consider that the interests of the people of London are so vital that they ought not to be entrusted to a Board nominated by 78 different authorities, and independent of public control. Next, they perceive an element of danger in such a Board having the power to decide by agreement what sum shall be paid to the Water Companies for their property, and, further, to create debt or levy rates. Finally, they object to the financial provisions of the Bill, and consider that these should be so amended as to make it clear that the award of the Court of Arbitration shall represent the "fair and reasonable value" of the undertakings, and be "determined as a sum of money." As far as representation on the proposed Board is concerned, the Council complain that they are worse treated now than they were by Lord James in 1896. Under his scheme, they would have had a majority on the Board, while the representation of the outside areas would have been left in the hands of the respective County Councils. This is regarded as a "reasonable and equitable" suggestion. But now the Council are to be "swamped" by the votes of the Metropolitan and Urban districts. The utterly vitiating feature of the Bill, however, according to the organ of the Council, is that it brings into existence "a body far too "unwieldy for the work it has to do, and one which is under "no direct control by the ratepayers, whose interests are "involved." With regard to the financial provisions of the Bill, the Council object to the Companies receiving the full value of their incomes in 3 per cent. water stock backed by the rates, as the stock will, they contend, be a superior security to water shares, and stand higher in the market.

Apart from the authority in Spring Gardens, opposition to the Government Bill is threatened from various quarters. During the debate which took place on the introduction of the measure, Mr. Sydney Buxton, the Liberal member for Poplar, condemned the Government for having delayed for six years the settlement of the London Water Question, to the prejudice of the ratepayers as the purchasers of the Companies' undertakings. He also strongly objected to the constitution of the Water Board, which he urged should be formed upon a much more representative basis than that proposed in the Bill. In fact, he regarded the County Council as the natural Water Authority for London. He intimated that he should strenuously oppose the measure; and he has taken the first step in the direction of carrying his intention into effect. It is, however, far more than individual opposition that the Government will encounter from Mr. Buxton. He has placed upon the paper of the House of Commons a notice of an amendment to the motion for the second reading of the Bill, committing the House to a declaration that, while welcoming the adoption of the principle of purchase and the creation of a special Court of Arbitration, it is of opinion that the authority proposed to be constituted for the purchase and control of the water supply of London is "unsatisfactory and unworkable, and "repugnant to the general principles of municipal govern-"ment." It is stated, on good authority, that the action of the honourable member has the entire approval of the Liberal leaders, who have decided to challenge, at the earliest moment, the whole policy of the Government on the Water Question, and to make this amendment the text for a full debate, ending with a division on party lines.

From several points, therefore, the Government Bill is threatened with attack when it comes up for second reading. But, notwithstanding these portents, Mr. Long is sanguine of the success of his Bill. He told the Hoxton Conservative and Unionist Council, with whom he dined last Wednesday, that the Government intend to place it upon the Statute-book this session. He is fully aware that the enemy is in the field; and, like a wise general, he does not under-estimate his opponents' strength. At the same time, he does not think there is going to be quite so much opposition to his Bill as some people appear to foresee. He characterized as ridiculous the statements emanating from the Progressives of the County Council that his measure is a reactionary one, and that the proposed Water Board would not be representative; and he commended the Bill, not only for its "intrinsic merits," but as being an agent in effecting the reform of the local government of London. We shall probably see, in the course of the next few days, whether Mr. Long's anticipations are likely to be realized.

Dual Powers of Supply.

A point of considerable interest to some of the Water Companies around London was raised at last week's meeting of the Colne Valley Water Company by a shareholder, who said he believed the Company, like some others, were in the position of having powers to supply definite areas coincident with similar powers being held by another Company. A part of the Colne Valley district, it appears, is overlapped by the West Middlesex Water Company, who, however, have taken no steps to enter into competition in the area in question. So long, therefore, as the present state of affairs prevails, the Colne Valley Company, who have spent capital in laying mains over the district referred to, have little to trouble about. But when the undertaking of the West Middlesex Water Company is transferred to the Board which is to be formed to take over the London Water Companies, things may be very different. For a while, the Board may not have much water to spare, and so will not be anxious to extend their operations; but when the time comes for a new supply of water to be brought to London (however distant that time may be), they may seek further sources of revenue to help defray the great cost to which they will be put. Such an opportunity for securing additional revenue might be found in that portion of the parish of Hendon—lying on the outskirts of the Metropolis, and so having great prospective value—over which both the Colne Valley and West Middlesex Companies possess rights of supply. It may be that these fears are groundless, and that the clauses of the London Water Bill of the Government will be found to afford ample protection in this and similar cases. But be this as it may, no time should be lost by those concerned in taking all possible measures to safeguard their interests. Now is the right moment for action; and the opportunity which has arisen for securing a clear understanding on all matters that may need adjusting, will, in all probability, if let slip now, never occur again. But we would venture to suggest to companies situated as are the Colne Valley Company, that there is an even surer way of protecting themselves from competition than by opposing

the Government Bill. Let them be careful (we do not suggest that they have not always been so) to provide such a supply of water—unlimited in quantity and irreproachable in quality—to the areas over which there exist dual powers of supply, that no fault can possibly be found with it. This will make another authority think twice—or even three times—before they decide to enter such districts in competition with the existing suppliers of water. The most valuable monopoly any business concern can possess is that which is secured by efficient service and reasonable charges.

Underground Rivers in Queensland.

The serious drought with which a large portion of the country was visited last year does not appear to have been restricted to this side of the globe. According to statements made by Dr. Logan Jack, in an address recently delivered at the Victoria Institute, Queensland has just passed through one of the periods of dry weather which usually follow the floods with which this colony is visited. Thus over-abundance and scarcity of water alternate. There appears, however, to be plenty underground, for where the supplies have been tapped excellent yields have been the result. Not very long ago, the borings which had been made gave about 321½ million gallons in 24 hours—a bulk of water computed to be sufficient to fill a lake of the size of Loch Katrine in a year-and-a-half. And yet it is estimated that this is not more than the 180th part of that which sinks underground, and which might, to a large extent, be recovered. But even if it were, it would be insufficient, according to Dr. Jack, for irrigation on any extensive scale; and it is this that the country needs. A most remarkable feature of Australian geography is the disappearance, except in wet weather, of several great rivers, such as the Flinders, which at the commencement are streams of considerable volume. It has been pretty well demonstrated that many streams are lost owing to their not being tapped by artesian wells. Though on the 30th of June, 1900, as many as 839 bores had been made, extending to a length of 185 miles, there appears to be still plenty of scope for the well-sinker.

Acetylene Generators.—The report of the Committee appointed by the Explosives Department of the Home Office to inquire as to the safety of acetylene generators, with a covering report to the Home Secretary by Captain J. H. Thomson, His Majesty's Chief Inspector of Explosives, has been presented (by command) to both Houses of Parliament.

Sugg's Low-Pressure Incandescent Lighting on London Bridge.—Last night the improved lighting of London Bridge commenced. This busy road between the north and south sides of the river is now furnished with 38 of Sugg's patent "Windsor" lamps, each being fitted with two of their patent 120-candle power incandescent burners, consuming in the aggregate 380 cubic feet of gas per hour, and giving a light of about 10,000 candles. On the side facing the river, the lamps are glazed with white glass, so that the maximum amount of light is reflected into the roadway. The old lamps consumed 15 cubic feet per hour, or an aggregate of 570 cubic feet, giving a light of about 1500 candles. Thus the new lamps emit about six times the light of the old ones, with a considerable saving of gas.

Inconveniences Attending Soft-Water Town Supplies.—It is commonly argued by partisans of soft-water supplies for towns, that hard waters (of which that of the River Thames is the most conspicuous example) cause great expenditure in soap on the part of the community, and are troublesome by reason of their boiler deposits. It is pointed out in the "Ironmonger" that there is another side to the picture, and that soft water is apt to be more difficult to deal with in heating apparatus than hard water. Soft water attacks the commercial metals—iron, lead, and zinc—with some activity; and as all inexpensive boilers, pipes, and cisterns are made of these metals, the trouble is a real one where the water is very soft. This remark applies only to heating systems; and the writer does not touch upon the trouble of soft-water supplies known as "plumbism." Galvanizing is no protection, as this only consists of a coating of zinc, which is soon eaten away. The steam-heating engineer even in hard-water districts has trouble with the condensed water, which is soft, and frets away nipples and tubes until they fail. Wrought iron can never be safely used where condensed water is met with. In hot-water heating systems, hard water forms a scale which coats boilers and pipes; but the metal does not perish. Where the water is very soft, the pipes simply rust, and the redness of the warm flow is often a great nuisance. Of course, the use of lead pipes for such water is highly dangerous; and the trouble is that where a boundless supply is specially provided for drinking, there is no dependence on servants always using it. The morning kettles are usually filled from the hot-water tap. From all that can be learned, a hot-water supply apparatus to be quite durable in a soft-water district, has to be of copper throughout. This involves great expense, and operates as a cheek upon the use of the convenience.

ESSAYS AND REVIEWS.

THE LEGAL RELATIONS BETWEEN GAS SUPPLY UNDERTAKINGS AND CONSUMERS.

(*Continued from p.* 337.)

We proceed to consider the fifth class of cases in which an individual or a private firm of partners may be in financial difficulties with their creditors—including the suppliers of gas.

A Debtor Adjudged Bankrupt.

Since the decision in *Smith, ex parte Mason*, whereby it was determined that the making of a receiving order against a debtor did not prevent the gas supplier from cutting off, and refusing to renew, the supply on account of the non-payment of arrears, the second step—that of adjudging the debtor bankrupt—is, in the case of businesses which the Official Receiver proposes to carry on, sometimes taken so promptly that the adjudication order is made before the usual three days' notice requiring payment of the gas arrears can be served and acted upon. Or, of course, the Official Receiver may decide that it is better, in the interests of the creditors generally, to allow the gas to be cut off rather than pay the arrears. What then is the position of the gas undertaking? It is, we think, generally assumed, and there are certainly grounds for assuming, that, so soon as the adjudication order has been made, the Official Receiver or the Trustee in the Bankruptcy, is entitled to a supply of gas without paying the arrears due. There is, however, no gas case deciding this point exactly; and the position has to be inferred. Looking at the Smith judgment (*ante*, p. 337), it will be observed that Mr. Justice Vaughan Williams based his decision upon the fact (determined by *Rhodes v. Dawson*) that the state of the debtor is unaltered by the making of the receiving order—that the premises continue to be vested in him. The debtor is therefore still the occupier, and the only person entitled to a supply of gas to the premises. Now, section 54 of the Bankruptcy Act, 1883, provides that—

1.—Until a trustee is appointed, the Official Receiver shall be the trustee for the purposes of this Act, *and immediately on a debtor being adjudged bankrupt, the property of the bankrupt shall vest in the trustee.*
2.—On the appointment of a trustee, *the property shall forthwith pass to, and vest in, the trustee appointed.*

The premises of a debtor do not, therefore, continue to be vested in him after adjudication as a bankrupt, and the trustee becomes the occupier, and, within the limits of his trusteeship, the owner of the premises. The question is whether he becomes a new occupier within the meaning of sections 11 and 39 of the Gas-Works Clauses Act, 1871, so as to be entitled to a supply of gas without paying the arrears. Section 48 of the Metropolis Water Act, 1871, is to the same effect as regards the liability of an incoming tenant for water-rate due from the outgoer as the Gas Acts; and under that section, it has been held, in the case of *Flack, ex parte Berry* ([1900] 2 Q.B. Div., 32) that, a debtor having been adjudicated bankrupt, the Trustee in Bankruptcy—who continued to carry on the business of the bankrupt (an oil and colour man) pending its sale as a going concern—was an "incoming tenant," entitled to a supply without paying the arrears due to the East London Water-Works Company at the date of the adjudication. Those arrears having been paid under protest (after the water had been cut off at one of the shops, which the sanitary inspector then ordered to be closed), the Trustee was entitled to recover them from the Company.

There is, however, one point that occurs to us in studying the Bankruptcy Act, 1883. By section 50 (sub-section 2) of that Act, it is provided that: "The trustee shall, in relation to, and for the purpose of acquiring or retaining possession of, the property of the bankrupt, be in the same position as if he were a receiver of the property appointed by the High Court."

Now it has been held that a receiver appointed by the High Court is not in the position of an "incoming tenant," but is only a caretaker "put in possession of the premises of a defaulting consumer to manage his business for the benefit of his creditors and himself" (*Paterson v. Gaslight and Coke Company*), even though the Order of the Court require the debtor to deliver up possession of his property to the receiver (*Husey v. Gaslight and Coke Company, ante*, p., 353). A gas undertaking which is frequently the loser through the bankruptcies of traders, might think it worth while to obtain counsel's opinion, or a judgment of the Court, upon the question of whether the above-quoted section, considered in the light of the Paterson and Husey judgments, affects the position of a Trustee in Bankruptcy in regard to obtaining a supply of gas without paying the arrears.

Certainly it appears to us that a Trustee in Bankruptcy is no more than a caretaker of the property he occupies, although, for the purposes of his trusteeship, the property vests in him. It is not his absolute property; his powers of dealing with it being strictly limited by the Bankruptcy Act. Nor is it absolutely the property of the creditors. For, in the unusual, but neither impossible nor improbable, event of a bankrupt's estate realizing more than the whole of his liabilities and the costs of administration by the trustee (a security or property might become suddenly and unexpectedly of much greater value than before), the surplus

realized would become the property of the discharged bankrupt. (See section 35 of the Bankruptcy Act, 1883.) Can, then, a Trustee in Bankruptcy be said to be anything more than a person "put in possession of the premises of a defaulting consumer to manage his business for the benefit of his creditors and of himself?" If he is not, then the gas undertaking can refuse to supply him, failing payment of arrears; for, as Lord Justice Lindley said in the Paterson case, "the statute (Gaslight and Coke Company's Act, 1872) contemplates, and provides for, a change of possession of a very different nature; and its language is quite inappropriate to cover such a case."

Of course, if Mr. Justice Swinfen Eady's view, expressed in his judgment in *Husey v. Gaslight and Coke Company* (*ante*, p. 354), that there is no section in the Gas Acts which entitles an owner to require a supply of gas when arrears for supply to the same premises remain unpaid, be correct, a Trustee in Bankruptcy would never be entitled to an unconditional supply to freehold premises. But we cannot believe that the expression in the Acts "incoming tenant" was intended to exclude an incoming owner; it obviously was meant to indicate a person coming in to "hold" the property, whether as landlord or tenant (in the general meaning of the term), in succession to another.

Composition or Scheme of Arrangement.

It not infrequently happens that a debtor, rather than be adjudged bankrupt, puts before his creditors (after the making of a receiving order against him) a proposal for a composition in satisfaction of the debts due by him to them; or a proposal is made for a scheme of arrangement of the debtor's affairs. Such a composition or scheme cannot, however, come into effect until it has been laid before the first meeting of creditors; confirmed, by a three-fourths (in value) majority of all the creditors who have proved their claims, at a subsequent meeting of the creditors, summoned by the Official Receiver by not less than seven days' notice, and approved by the Court. If the composition or scheme be adopted and approved, and no trustee be appointed thereunder, the debtor would be compelled to pay the arrears of gas if he required the supply to be continued. If, however, as is generally the case, a trustee be appointed to administer the debtor's property or manage his business (in pursuance of a composition or scheme), such trustee would be in the same position as a Trustee in Bankruptcy—that is to say, the property would vest in him by virtue of section 54 of the Bankruptcy Act, 1883. (See section 18, sub-sections 12 and 13, of that Act.) But whether or not such trustee would be entitled to a supply of gas without paying arrears, is scarcely a material point; for, as at least seven days must elapse between the proposal and the confirmation of a scheme or composition, the gas supplier has ample opportunity in the interim for obtaining payment of any arrears, if a threat to discontinue the supply will suffice to enforce payment, as it generally will in the case of a business worth carrying on.

Receiver for Debenture Holders.

A receiver entering into possession of the property of a company, whether put into possession by the mortgagees—that is, the debenture holders—under the powers conferred upon them by the debenture deed (or by the Conveyancing and Law of Property Act), or taking possession under an order of the Court of Chancery at the instance of mortgagees, is not entitled to a supply of gas without paying the arrears; though, of course, he cannot be sued for those arrears if discontinuing the supply does not compel him to pay. The law on this point was laid down by the Court of Appeal in the case already several times referred to—namely, *Paterson v. Gaslight and Coke Company* ([1896] 2 Ch. Div., 476). This judgment has been lately strengthened by that of Mr. Justice Swinfen Eady in *Husey v. Gaslight and Coke Company*, and both decisions have been discussed recently in the "JOURNAL." As, however, it is intended to make these notes as full a summary of the law as between undertaking and consumer as possible, in the hope that such a bringing-together of the several decisions and enactments upon the various points may be of service to gas managers for purposes of reference, the above-mentioned judgments must be briefly commented upon here.

Marriage, Neave, and Co., Limited, carried on the business of flour-millers at Albert Mills, as the Albert Mills Company, and borrowed money on debentures, executing two debenture deeds in the usual form, in favour of the first and second debenture holders respectively. Both deeds contained clauses enabling the debenture holders to appoint receivers, and enabling the Mill Company to carry on the business until the happening of certain events, when, if receivers were appointed, they were to be, in the usual way, the agents of the mortgagors. The trustees under one deed subsequently appointed a receiver; whereupon the trustees under the other deed moved the Court to appoint receivers and managers under that deed, and such receivers (of whom Paterson was one) were appointed and took possession. The Gas Company then gave notice to the receivers that they would not continue to supply gas unless the arrears, about £90, were paid. Mr. Justice Kekewich held that the receivers were entitled to an unconditional supply; but on appeal, this decision was reversed. The following are the salient points of the judgment pronounced by Lord Justice Lindley (Law Times Reports, LXXIV., p. 643):—

The right of the Gas Company to refuse to supply gas to the Mill Company unless they paid the £90 14s. 5d. had accrued before any receiver was appointed, although the notice that such right would be enforced was not given until afterwards. The receiver appointed by the trustees on Feb. 6 is clearly in no better position in this respect than the Mill Company. The receivers appointed by the Court on the 17th of February are not technically appointed under the terms of the debenture trust deed, and are not in all respects in the same position as receivers appointed by the trustees themselves. At the same time, the receivers appointed by the Court are appointed for the benefit of the debenture holders; and, having regard to the nature of their security, and to the obligations imposed by statute on the Gas Company to continue to supply gas to the Mill Company, it would, in my opinion, be very unjust if the debenture holders could enforce this obligation against the Gas Company without complying with the condition of paying for the gas supplied to the Mill Company while the debenture holders permitted the Mill Company to carry on its business. . . . Section 18 of the Company's Private Act of 1872 [as to an incoming tenant and the payment of arrears, *ante*, p. 336.] . . . has, in my opinion, no application to such a case as that before us. It does not apply to persons simply put in possession of the premises of a defaulting consumer to manage his business for the benefit of his creditors and of himself. The statute contemplates, and provides for, a change of possession of a very different nature; and its language is quite inappropriate to cover such a case as this. The plaintiffs' rights as receivers and managers were merely those of custodian of the Mill Company's property. The relation of the Mill Company to the plaintiffs was not the relation of outgoing and incoming tenant, nor of vendor and purchaser, but that of owner and caretaker. . . . The position of the plaintiffs towards the Gas Company is precisely similar to that of the Official Receiver in Smith's case . . The appeal must be allowed.

The judgments of Lords Justice Lopes and Rigby do not call for any comment; being to the same effect as the foregoing. The case of *Husey v. Gaslight and Coke Company* decided that the fact that the order of the Court appointing Husey as receiver of the property of the Mansions Proprietary, Limited, required the Company to deliver up possession of their property to Husey, as receiver, "so far as was necessary for the purposes of the receivership," did not put Husey in a better position to require a supply of gas than was Paterson, though the order in Paterson's case contained no such direction. It is, indeed, difficult to understand why any Counsel should have advised that this direction did make any difference, in view of the paragraph in Lord Justice Lindley's judgment, in which he speaks of the "incoming tenant" clauses in the Gas Acts as not applying to cases of persons simply put in possession for the benefit of the creditors. The case of *In re Marriage, Neave, and Co.* ([1896] 2 Ch. Div., p. 663), in which his Lordship spoke of the omission of any direction to deliver up possession of the property to the receiver as being "very important," had to do with the right to distrain for rates—a very different matter from ceasing to supply gas. The paragraph in the Paterson judgment to which we have referred, seems to us to have a very wide scope; and we should be interested to see the position of a Trustee in Bankruptcy discussed in its light. It would certainly appear to cover the case of a

Company in Liquidation.

We know of no decided case as to the right of an Official Liquidator to a supply of gas without paying arrears due for gas supplied to the Company; but there appears no ground for holding that such liquidator is in a better position than the liquidating company. He is only a caretaker—a person put in possession to manage the business for the benefit of the creditors and the shareholders. Section 94 of the Companies Act, 1862, does not even vest the property in the liquidator; it merely provides that he shall take into his custody, or under his control, all the property of the Company, and act under the direction of the Court in the winding-up. He is not, therefore, in so strong a position as a Trustee in Bankruptcy. Unless and until a judgment to the contrary be given, gas undertakings should certainly refuse to give a supply to a liquidator, except upon payment, or undertaking to pay, all arrears due.

Consumer a Mortgagor making Default.

Under this heading, we may consider the two situations that might arise in the event of a mortgagor (other than a public company, as to which, see *post*) making default in payment of the mortgage money, or of part thereof, or of interest due under the mortgage. The mortgagee may then either appoint a receiver of the income of the mortgaged property, or enter into possession himself or by his agent, for the purpose of either selling the property or of occupying it for his own benefit.

If a mortgagee enter into possession of the mortgaged property himself or by his agent, either to sell or to occupy the premises, he is then, apparently, as owner and occupier, entitled, under and subject to sections 11 and 39 of the Gas-Works Clauses Act, 1871, to claim a supply of gas regardless of any arrears due from the mortgagor. In the event, of course, of the mortgagor exercising his right to redeem the property, he would be obliged to pay any arrears remaining due from him.

Whenever a mortgage is made by deed, the mortgagee has the power, under the Conveyancing Act, 1881 (44 and 45 Vic., ch. 41), section 19, sub-section 1 (iii), to appoint, by writing under his hand, a receiver of the income of the mortgaged property. Inasmuch as it is provided by section 24, sub-section 2, of the Act, that "the receiver shall be deemed to be the agent of the mortgagor, and the mortgagor shall be solely responsible for the receiver's acts or defaults, unless the mortgage deed otherwise provides," and, by section 24, sub-section 8, that "the receiver shall apply all money received by him as follows . . . and shall pay the residue of the money received by him to the person

who, but for the possession of the receiver, would have been entitled to receive the income of the mortgaged property," it is quite clear that the mortgagor's beneficial occupancy is not determined by the appointment of the receiver, and that, such receiver cannot claim a supply of gas without paying any arrears due. That this is good law will be seen from the decided cases bearing upon the position of a receiver appointed to manage the affairs of a company making default to the debenture holders, which we have now to consider.

THE EARLY HISTORY OF INCLINED RETORTS.

SOME day or other, when the full and detailed history of the inclined-retort system, not only in this country but in Europe, America, and throughout the world, comes to be written, it will certainly prove not the least instructive or interesting chapter in the whole volume of the gas industry. Recent events, discussions, and inquiries having naturally drawn particular attention of late to this method of carbonization, perhaps a slight summary of its early history will not be devoid of interest or value, more especially to those whose years or environment have not brought it directly under their notice.

One speaks of the "early history" of inclined retorts; yet even that, in any practical sense, merely refers to events not further removed from us than by the comparatively short period of from seventeen to twenty years, or about one-fifth of the present age of the gas industry itself. Of course, it is pretty well known that the inclined retort was one of the original forms of retort experimented upon by the practical founder of gas lighting. Any reader of Clegg's "Practical Treatise on the Manufacture and Distribution of Coal Gas" will call to mind the four illustrations, given in its opening pages, of the primitive cast-iron retorts. The first, but a vertical pot, as it were, with a gas outlet; the second, also vertical but bigger, and with an added opening; the third, placed at an angle, and obviously the forerunner of the inclined retort as we know it; and the fourth, horizontal as ordinarily adopted. The remark that the third form is "more economical" than the first two, but not so much so as the fourth, may be remembered. This original sloping retort was tried by Murdoch, probably about the year 1804, and may also have been used later by Clegg and Accum. It is not by any means clear what exactly were the reasons which led to the inclined retort, after its first early use, falling into absolute desuetude, as it did for over three-quarters of a century. The whole explanation can hardly be found in that given in "King's Treatise," which remarks that retorts with two openings "were necessarily more costly than those having only one opening; and they were, on the whole, found more troublesome to manage and keep in order." Be that as it may, the first inclined retort was no sooner tried than it was superseded, thus closing its initiatory history.

The second portion of its career might almost be described as its period of incubation; and an exceptionally long one it certainly was—extending practically down to ten years ago, or to 1892. It is with this period that we are now more particularly concerned, as the subsequent history of the subject—the period of actual establishment and progress—is still being made. As every one knows, the inclined retort, in a more or less practical form, made its re-appearance under the management of M. André Coze, at Rheims, in 1885. Apparently, however, before this, there were some efforts made by others to establish this method of setting retorts, as one finds references to attempts made by the Paris Gas Company in 1849. Then also, with the advent of the clay retort, and generator furnaces, and many other altered conditions, there arose a general desire for modification and improvement in carbonizing practice. Our patent records of the time bear witness to the development taking place, by the numerous applications for protection for all sorts of mechanical stoking appliances in conjunction with both inclined and vertical retorts, some having in view the continuous carbonizing of coal. Such schemes were not, however, as a rule, in a direct line with the inclined-retort principle, and may, therefore, be overlooked. Returning then to M. Coze. His first paper, under the title of "A New System of Automatically Charging and Drawing Gas-Retorts" was read before the Société Technique du Gaz en France at their meeting at Bordeaux in June, 1885. It was fully noticed and illustrated in the "JOURNAL" for Aug. 4 following, though the practical application of the system was at that time limited to but four months' experience with one setting of three retorts, placed, without cover, at the Rheims Gas-Works. The publication of the English account, however, at once drew a letter* from Mr. W. Key, of the Tradeston Gas-Works, Glasgow, who claimed that "the plan given almost describes that which was designed by me in 1880 for this very purpose—to charge and draw automatically, and to lessen the quantity of machinery hitherto employed in charging and drawing operations." This was followed in the next issue of the "JOURNAL" by a fuller account of his design, which was also illustrated, and which it is interesting to refer to at the present time.† The figure shows a double bench of straight through inclined retorts, with the charging stage in the middle, as in a modern arrangement, and an overhead hopper in between the benches. Mr. Key's article may be found of interest, and some of it is therefore reproduced. He says:

The method employed for charging is by a partly fixed and partly moveable scoop. The fixed portion is formed of ½-inch boiler-plate, and is of sufficient area to contain the whole charge; the moveable part is of steel $\frac{5}{16}$ inch thick, and is counterbalanced, so as to be easily drawn down or up. When drawn down, it is entered a little way within the retort mouthpiece. *The discharge of the coals from the fixed scoop is effected by an action similar to that employed on an ordinary shot-bag for measuring shot* for the charge for a muzzle-loading fowling-piece, only for the coal-scoops it is worked by air at high pressure.

We have considered the use of italics justifiable in this case; and we have adopted them to call attention to the fact that in 1880 the shot-pouch principle had been thought of for charging inclined retorts. Yet in 1902, one still hears and sees claims to it, as though it were some up-to-date novelty! It may also be noticed, in passing, that Mr. Key anticipated using compressed air for working his measuring chambers—for such they were—while for the latest and most complete installation of inclined retorts, it is proposed to use hydraulic power for the same purpose. The article continues:

On the front stop being lifted, the back stop is simultaneously lowered; thus preventing any more coals from getting into the retort than the proper measure. When the charge has been slid into the retort, the front stop is again lowered; and, by the same motion, the back one raised. The fixed scoop is then again full, and ready for the next charge for that retort.

After this twenty-year old description of modern inclined-retort charging apparatus, we may turn to the writer's suggestions for handling hot coke—

The coke from the retorts is shown dropping on to a passing endless chain and plate belt. In its passage it is quenched by a fine spray of water, and by the steam enclosed in the chamber for the purpose.

We seem to have heard something similar to this recently claimed as a novelty. Yet the author goes on to say that—

This portion of the arrangement I designed in December, 1875, and calculated that there would be a saving of upwards of £60 per week in wages, if erected to carry the coke from the retorts to the top of the bing, including quenching and screening and placing it at a level for tipping into a railway truck boat or cart.

Here again, we have what is very generally considered to be a somewhat exceptional and very modern arrangement. Concerning it, Mr. Key says: "But like the retort-setting, no opportunity has occurred for me to put it into practice." This can now only be regretted. But had it been otherwise, does it not seem as if some present-day gas-works' tendencies would have been greatly expedited? And where, it may be asked, were our energetic, wide-awake, progressive leaders in 1885 and before? In this connection, the last sentence of the "Communicated Article" may be noted: "My plan is perfectly free for anyone to adopt or improve upon."

Another claimant also wrote to the "JOURNAL" on the subject of "The Automatic Charging and Drawing of Gas-Retorts;" and the letter appeared in the issue of Aug. 25, 1885, on page 340. It was from across the Atlantic—from Mr. W. M. Cathels, Fredericton, New Brunswick. "My object in writing is to place on record the fact that the same system (as the Coze) was perfected by my father, the late E. S. Cathels, some time before he died; and I have now in my possession the full set of working drawings, in which the whole arrangement of charging sloping retorts by gravity is shown, and also a modification of charging horizontal retorts in the same manner by a peculiar arrangement of shoot." We know of gas engineers to-day, who are still thinking out the problem of charging horizontal retorts "by a peculiar arrangement of shoot!" The letter is also of interest as it introduces, we believe for the first time, the American term "sloping retorts," which is sometimes contracted to "slopers," and to which stokers naturally added "Ally." It may, further, here be remarked that to America also is due the somewhat objectionable abbreviation "inclines;" while the familiar phrase, "inclined retorts," we think we are not wrong in saying, was only used for the first time in the "JOURNAL" of Aug. 3, 1886, in "Technical Record," under the heading of "Coze's System of Carbonization in Inclined Retorts."

This brings us to M. Coze's second paper on the subject, read before the French Gas Society at their meeting in Paris in June, 1886. It was an amplification of his former contribution, and described certain improvements he had adopted in building a setting of nine inclined retorts. The heating arrangements were also a great step in advance; M. Lencauchez having assisted the author in the design of producer, regenerator, and furnace generally. Slight changes were also made in the charging arrangements, though these were still rather primitive, consisting in tip-trucks running on the top of the bench, and discharging into bedded-in cast-iron shoots, connecting to the upper end of the retorts. The angle of the retorts was also increased from the original 29° to 30°, which was found convenient for all classes of coal. For this paper M. André Coze was awarded one of the prizes presented by the Société Technique du Gaz for the best communications. For some twelve months after this, apparently there was nothing new to chronicle, as our gas literature was silent on the subject; so no doubt our engineers were quietly considering the question. The silence seems to have been broken by a voice on the other side of the Atlantic, when Mr. H. Pratt, of Chicago (Ill.), read a paper, the first bearing the title of "Inclined Retorts," at the Western Gas Association meeting. This was duly recorded in the "JOURNAL" in the issue of

* See "JOURNAL," Vol. XLVI., p. 247. † *Ibid*, p. 291.

July 24, 1888. The author "had constructed a bed of six retorts over a common furnace, each retort being 12 feet long, 13 in. by 24 in. at the upper, and 13 in. by 28 in. at the lower end." It is important to note that this would appear to be the first instance of an inclined retort with a taper given to it, to facilitate the discharge of the coke. "The charging apparatus consisted of a travelling-hopper supported on overhead rails, above the level of the top row of mouthpieces, and having shoots for delivering the coal into each retort as desired."

In the discussion that followed, Mr. R. D. Walsh stated that, having been so pleased with his inspection of the original Coze setting of nine retorts, a similar set of five retorts had just been started in work at St. Louis. At the following year's meeting of the Association, he also gave a paper describing this particular installation.* Our American friends were therefore before us in their trial of the inclined-retort system; though for one reason or another they have since fallen much behind in its practical adoption. There are not, however, wanting signs that this backwardness is about to be remedied to some extent.

(To be continued.)

THE GOVERNMENT BILL TO AMEND THE PATENTS ACT, 1883.

As announced in the newspaper reports of the proceedings of Parliament, the Government Bill to amend the law with reference to applications for Patents and Compulsory Licences, has been introduced in the House of Commons. It is now printed, with the names of the Law Officers of the Crown on the back; and it is expedient that everybody who is at all interested in the subject of patents should be informed as to the nature of the alterations proposed to be made. Broadly speaking, the Bill is drafted to conform to the recommendations of the Departmental Committee presided over by Sir Edward Fry, whose report was favourably noticed in the "JOURNAL" when it appeared. The first clause of the Bill states that, where an application for a patent has been made, after the complete specification has been deposited, the Examiner shall—in addition to the inquiries which he is directed to make by the Act of 1883—make a further investigation for the purpose of ascertaining whether the invention claimed has been wholly or in part claimed or described in any specification (other than a provisional specification not proceeded with) of prior publication in the Patent Office, during the previous fifty years. If on investigation it appears that the invention has been wholly or in part claimed or described by any such specification, the applicant is to be informed thereof, and given the opportunity to file an amended specification, which is likewise to be investigated. The result of these investigations is to be reported to the Comptroller. The provisions of section 9 of the Act of 1883 are to apply to these reports—the reports not to be published, and only to be producible in legal proceedings under particular conditions.

If the Comptroller is satisfied that no objection exists to the specification, on the ground that the invention claimed has been wholly or in part claimed (or described?) by an earlier specification as before mentioned, he is to accept the specification in the absence of other legal objection. If the Comptroller is not so satisfied, he shall, after hearing the applicant, and unless the objection be removed by amendment of the specification to his satisfaction, determine whether any, and if so what, reference to the prior publication ought to be made in the specification by way of notice to the public. An appeal will lie under this section to the Law Officers. The period for depositing the complete specification is to be curtailed to six months; thus restoring the older rule in this respect. It is declared that the investigations and reports as required by this section are not to be taken as guaranteeing the patent in any way; and no liability in respect thereof is to attach to any official. An invention is not to be deemed to be anticipated by reason only of its publication in a patent specification more than fifty years old; nor of its publication in a provisional specification not proceeded with, of any date. The latter provision is a reassertion of the principle that the contents of provisional specifications, as such, are held secret. An extra fee of not exceeding £1 may be levied in respect of the new investigation, payable on the sealing of the patent. The section is not to be retrospective, but is to come into operation on a date to be ordered by the Board of Trade.

Section 2 of the Bill relates to Compulsory Licenses, at present issuable by the Board of Trade under section 22 of the Act of 1883. This section is to be repealed; and in its place the following provisions are to be enacted: "If on the application of any person interested, it is proved to the satisfaction of the Court that the reasonable requirements of the public with reference to the invention have not been satisfied by reason of the neglect or refusal of the patentee to work the patent or grant licences on reasonable terms, the Court may order the patentee to grant licences," on such terms as the Court may deem just in all the circumstances. On such hearing the patentee, anybody claiming an interest in the patent as exclusive licensee or otherwise, and the Law Officers, may appear as parties. In such proceeding, the Court may, if it thinks fit, and shall, at the request of any party, call in the aid of an expert assessor. An order of the Court under this section is to operate as a deed of agreement between the parties. In awarding costs, the Court is to have regard to any previous offer of a request for a licence. An appeal from the order of the Court will lie to the Court of Appeal; but no further, save by consent of the Court of Appeal. The procedure is to be regulated by Rules of Court. The section is to be retrospective. The Act is to come into operation at the commencement of next year.

It will be perceived from the foregoing abstract, that the Bill consists of two principal clauses, whereof the former deals with the modified official investigation for prior publication of the subject matter of inventions claimed in English Patent specifications published within fifty years; while the latter is a resettlement of the new law of compulsory licencing, which only dates from 1883. The Government and the Board of Trade are to be complimented on the promptitude with which they have initiated legislation on these important matters, which so closely affect the industrial progress of the country, yet do not furnish much pabulum for "popularity." The institution of the search for prior publication in a Patent Office specification is both practicable and serviceable. It will not cost very much; the staff of the Patent Office are already accustomed to the same kind of work in preparing the excellent abridgments of classified specifications; and practically no time will be lost in dealing with applications.

There has been a good deal of ignorant clamour for an official search for novelty and utility; and this will probably continue in certain unimportant amateur mechanics' periodicals. Those who ask for this extension of Patent Office business usually show that they are under the delusion that an American or German patent, granted after a general search, carries with it some sort of guarantee. Of course, there is no national government that ventures to guarantee the patents it grants. Those who are better acquainted with the German and United States patent systems, are by no means in love with them. The vast and rapidly increasing bulk of printed matter relating to subjects of invention is fast reducing official searches for general anticipations to the merest matters of form. The proposed English practice will exactly hit the happy mean. While paying an applicant the compliment of crediting him with knowing his own business generally as well as any official, it places at his disposal the fruits of an official learning which he cannot be expected to share. It does this for a trifling fee; and there is to be no delay on this account. Compare this with the tediousness and irritating formality of American or German officialism. Above all, it removes the last shred of justification for the often-heard complaint that the Patent Office takes a man's fees for a patent which it knows to be invalid. In future, the applicant is to be admitted to the fullest knowledge possessed by the Office on the point of prior official publication; and this is as much as any reasonable inventor can ask. It cannot be the duty of a Government office to make good an outsider's lack of general information.

With regard to the new system of Compulsory Licences, the first thing to strike one's attention is that the jurisdiction has been taken from the Board of Trade and entrusted to the High Court. Mr. J. W. Gordon, Barrister-at-Law, whose book on "Compulsory Licences" we reviewed on its appearance, must be a proud man this day; for he stood out in his work for the change now proposed. He did this on the reasonable ground that the Courts, and not a Department of State, should be the tribunal to dispense justice to the subjects of the Crown. The argument is sound; and it may be taken that experience of the working of the Board of Trade in a judicial capacity has not convinced the Government of the wisdom of the arrangement. Mr. Gordon pointed out many serious imperfections in the Board of Trade procedure under section 22 of the Act of 1883. Whatever the intention of the framers of the Act in this regard, the practice was "so manifestly defective that the barest statement of it reads like a diatribe." It certainly failed to give satisfaction to anybody; and its discontinuance will not be lamented. Still, the spirit of the enactment remains, and there has never been any question of the value of this remedy for the unfair dealing or *lâches* of patentees. Originally, in law, a patent right was regarded as not subject to any condition at all. So much was laid down in the very strong judgment in the *Incandescent Gaslight Company v. Cantelo*, where it was declared that the patentee is sole master of his actions in regard to the patented thing. He has the sole right of using or selling the patented articles, and can prevent anybody from dealing with them at all. Inasmuch as he possesses the major right of preventing anyone else from touching the things, he has the lesser right of imposing his own conditions. Much astonishment was created by this judgment; but it has never been upset, and therefore it stands. It was one of the most fatal of the triumphs of the unfortunate Welsbach Company, and lured the old arbitrary administration of the Company to their fall.

This excessively high rating of the privileges of patentees can only be corrected by invoking the compulsory licence. This was originally devised as the English improvement upon the well-known requirement, observed in the patent systems of several countries, that the patent should be "worked" in the country within a certain fixed period. The practical value of this particular requirement is *nil;* and no sound authority was found to recommend its importation into the Act of 1883. It was felt, however, that the public interest demanded the sufficient operation of a meritorious invention; and therefore this new condition was brought into the English Patent Laws, under which patentees might be prevented from acting a dog-in-the-

* See "JOURNAL," Vol. LIV., p. 55.

manger-like part. In the Act of 1883, there are three reasons cited as good for sustaining the petition of "any person interested" for compulsion being put upon the patentee to grant licences. These are now reduced to a single plea, implicating only "the reasonable requirements of the public." There is, moreover, another count added to the indictment of the peccant patentee. According to the Act of 1883, it is only his default to grant licences on reasonable terms that could bring him within the grip of the Board of Trade. In future, proceedings may be taken in Court in cases of "the neglect or refusal of the patentee to work the patent or grant licences on reasonable terms." It appears that the proceedings may be initiated by anybody interested, if only as a consumer: and if the cause advanced is that the reasonable requirements of the public have not been satisfied, through the patent not having been reasonably worked, then there will be no obligation to make application for a licence—although the fact may be taken into account in the award of costs. It is a notable project of legal reform, which will touch precisely that small but important class of valuable, because useful, patents which have hitherto given the greatest public dissatisfaction with the existing order.

SOME POINTS OF ECONOMICAL IRONWORKS CONSTRUCTION.

Not long ago, an article appeared in the "Engineer" entitled "Bridges in Theory and Practice;" and as the words "gasholders" and "iron roofs" might be substituted for the word bridges in the original, we propose to appropriate the wisdom of the writer for the benefit of the designers of such works in steel and iron as commonly occur in gas-works. The point of the article is the difference that frequently exists between the theoretical (structure as it might be schemed by a mathematician expert in the computation of strains, and learned in the strength of materials) and the most suitable structure for which tenders should be invited. It is an old opposition; and our valued contemporary has not succeeded in adding much that is new to the literature of the eternal controversy between what is called the theory and the practice of steel and iron construction. At bottom, of course, there ought to be no antagonism between the two rules of planning; but it is equally true there must always be a difference between the ideal and the expedient. This is where so many of those who take sides in this controversy go wrong. There cannot possibly be any opposition of true theory to good practice. It would be a contradiction in terms. But between the conception of what a structure ought to be, and what it is practicable to make it, there is a margin which it should be the constant study of the professor in his chair, and the erector in the yard, to reduce.

Here are the two forces—the men who know what ought to be, and the other men who are able to do work which may possibly be good or bad. The professor of applied science may design a beautiful gasholder framing, for which no gasholder builder would tender. On the other hand, if left to himself, the mere erector would undertake to put up a job which would be an eyesore to the judicious engineer, not to mention the professor. Roughly speaking, all engineering structures may be divided, as the "Engineer" says of bridges, into two principal classes. The first is the big work, the notable work, which, when completed, constitutes a veritable triumph of engineering. These special structures demand special treatment. It is the laudable ambition of a good engineer to be identified with a really successful and creditable work of this category. It is the glory of the engineer when all the world talks of his triumph in the language of understanding—when the difficulties overcome are appreciated; and the originality of the conception, the boldness in suggestion, or the economy in execution of the designs, constitute the engineer's enduring monument. There is nothing in mere bigness, or eccentricity, to reflect credit upon the designer; and for very much that is really creditable to an engineer, he cannot expect to receive any credit at all, because it is not known. But in the main, true greatness cannot be hidden, whatever form it happens to take. It is, however, impossible to force the note of distinction.

This consideration points straight to the second category of engineering works, to which by far the greatest number of structures in hand at any one period belong. This is the class of ordinary jobs, which are to those of the first class as the architecture of a parish church is to that of a cathedral. It is, of course, quite possible to do small and ordinary work in a distinguished style; but the style must be germane to the matter. In structural iron and steel work, it means the use of standard sections and the materials of the market, put together in absolutely the most suitable and expedient manner. That, in the circumstances, constitutes good practice. It would be absurd to say that it is antagonistic to true theory; but it is quite true that theory alone would not inspire such designs. There should be nothing opposed to theory in them; but the theory should be clothed in work-a-day integuments.

The ruling truth of the matter is, that "in the manufacturing world certain things are made in quantities, and are, therefore, easily obtained, and they are as cheap as they can possibly be. The wise man buys these things, and makes the best of them. The consulting engineer wants a new coat. His tailor does not possess cloth of the particular texture and colour required. He tries to buy it, and finds it is not in the market. He can have it woven and dyed to his order. The tailor explains to the consulting engineer that he cannot supply the coat in less than two months, and that he must charge £15 for it. Then the engineer is disgusted, and sends to Paris and buys a totally different coat, for which he pays 50 frs., and afterwards complains to the world that the English tailors are losing all trade and going to the bad generally." This is the "Engineer" allegory, which does not require an explanation. It is used to condemn, by implication, a mass of so-called consulting engineer's work, in which special bars and plates are specified unnecessarily, and a lot of work that must be done by hand is drawn either wilfully or ignorantly.

An example is cited of a bridge once erected in Paris, which was designed according to the severest mathematics of French collegiate engineering. Bars were included in the specification which differed from each other in thickness by half-a-millimetre. The contract could not be placed, for the simple reason that there was not a rolling mill in France that would undertake to roll iron under a penalty to $\frac{1}{50}$th inch of thickness. Consequently, the whole of this minute designing had to be sacrificed, and the engineers had to accept bars which might be as much as 2 millimetres too thick. In England, the nearest sixteenth of an inch would have been made to serve the turn. The true moral of this story is not that the professors were wrong in determining what scantlings were required; for according to the data in the case that is good theoretical engineering. The mistake arose in not adjusting their exact knowledge to market facilities, which is not a question of theory at all, but of ordinary common sense. If the theorist would only be careful to reckon with the metal merchant as well as with the erector, he would beat the mere "rule-of-thumb" constructor every time, because he would know where weight could be saved without endangering stability.

So the youthful draughtsman, drawing iron work, should bear in mind the rule of practical economy. Most ordinary structures can be built of few leading scantlings, which can be had at once without difficulty or delay. Again, there is the question of working length. The usual lengths of bars, and sizes of sheets, must be thought of by whomsoever would save money; and the work of the forge must, for that same reason, be kept down to the barest necessity. How often in gasholder and roof work is there displayed a quite superfluous amount of smith's work, which a little forethought would have obviated! It is a mistake, moreover, to imagine that a draughtsman brought up to the work of the bench or forge is necessarily reliable in regard to dispensing with unnecessary hand work. Far otherwise, indeed; some of the most expensive work being attributable to what would be called the "practical" element in the drawing office, where it exists. Nor does it follow that a contractor is necessarily the best authority on the cheap execution of work. It comes back to this, that the display of judgment in adapting the design to its proper purpose, with the most prudent regard for the employment only of the most available and cheapest materials, and the most advantageous method of construction, is for the engineer. There is nothing to complain of in this; for, rightly regarded, there is as much scope for the economics of engineering in the construction to local requirements of a 100-feet gasholder as there is in the making of the monster structures which dominate the Greenwich marshes. In a sense, the engineer who can do the one, could succeed with the other.

This matter of economical ironwork construction is a very sore point with many worthy and painstaking English manufacturing engineers. During the lifetime of the past generation, every gasholder on the Continent of Europe, and most of those erected in any part of the world, came from English yards. There is, as one should say, something peculiarly English about the construction of gasholders. The riveting so regularly spaced, and the carefully flattened sheets, were very English. Until recent years, if it had been too much to say that Continental workmen could not flatten sheets of iron, at any rate it was hardly ever done. It was quite the usual thing to see the palatial blocks of buildings in the newer streets of European capitals shuttered with abominably bulged and crinkled plates. When the French and Germans began to make gasholders for themselves, they were contented with work that an English engineer would have unhesitatingly condemned at sight. They can do better now; and much of the foreign work has lessons for English builders.

The golden rule for draughtsmen of structural iron and steel work is, therefore, for ordinary purposes to stick to common scantlings and market materials. Next, details should be carefully worked out, so as to save labour in smithing, cutting, and riveting. The saving of weight is sometimes a fault if it entails tooling what might be dispensed with. Round bars with forged ends are a superstition of the drawing office; flat ties will answer equally well. A good guide is to avoid as much as possible everything that cannot be done in the cold. All joints should be placed where the men can get at them while working easily. If screwed ends come where the nut is hard to turn, the chances are that the work will be scamped. Where is the sense of putting the end of a holding-down bolt inside a hollow column casting, where only an 18-inch spanner can be got to take it? Those who have to estimate for contracts of this class are helpless in the hands of the designer; but, like the traditional parrot, they "think a lot" when required to do absurdities. Money is wasted, or saved, in the drawing office of the engineer, not of the contractor. Yet an engineer who cannot put himself in the contractor's place, and look at a design from the point of view of the merchant of materials and the erector, is an imperfect craftsman.

THE DUTY OF EMPLOYEES.

In spite of all that has been said on the subject of the duty of the workman towards his master and himself, there is still ample room for spirited and convincing treatment of the question by those in a position to influence the opinions of their fellow men. Countless warnings have been given of the certain disaster which will result from the policy (if persisted in) which is adopted by so many of the working men in this country. It would perhaps be incorrect to say that these warnings have been quite unheeded, but, on the other hand, it can safely be asserted that they have not received the attention they deserve. In this instance, it cannot be expected that bare statistics will appeal with proper force to those most in need of the lesson they would teach; and therefore it is necessary to indicate in simple language the conclusions to which they point. This has been done many times already; but it will have to be done many times more.

Every effort in this direction is to be heartily welcomed; but the gathering together of unassailable arguments, the putting into line of hard, unvarnished facts, is not everything—they must be placed prominently before those for whom they are intended. The seed must not fall upon a rock, but among good ground, where it will take root and flourish. The proofs, unfortunately, are too easily found; the difficulty lies in convincing the British workman of their worth. The text is a simple one; and it is this: "In studying his master's interests, a man best studies his own." Of late years, some noble (and successful) efforts have been made by certain employers to induce their employees to see this; but how different is the feeling with which the majority of our working men are imbued. Their master is their enemy; they recognize the existence of no interests in common; they are governed by one object, and one object only—and that is to do as little work as they possibly can for as much money as they are able to secure. Absurd error! Most unutterable foolishness! Yes, we know that; but how to convince the deluded victims of the utter falsity of the ideas that have been instilled into their minds—partly, but perhaps not wholly, for there is a touch of human nature in them, too—by interested parties? The various systems of profit-sharing now being increasingly adopted form one means of doing this; the publication and distribution of papers and pamphlets dealing with the question form another. We have been led to these considerations by the perusal of a most interesting address on the subject recently delivered by the President (Mr. C. E. Parker) at the annual meeting of the Warrington Chamber of Commerce. It is greatly to be feared that this most powerful indictment of the motives which at present govern so large a proportion of the industrial classes in England will not be read so largely as it deserves. The space at our disposal, however, will not permit us to do more than notice the most important—there is no part of it that can be called unimportant—points brought forward in the address.

Amid the many subjects for congratulation in connection with the commercial position of this country, Mr. Parker notes various signs that England cannot hope to maintain its foremost place, unless the most strenuous efforts are made to hold and extend the dominion won. A significant feature of the past year is the fact that America has stepped to the world's front place as an exporting country—thereby displacing England. Though it could scarcely be expected that a population of 45 million people (the number in Great Britain) could keep pace with one of 85 millions (the number in the United States), Mr. Parker is doubtful if it is altogether a question of population. From careful observations made in both countries, his deliberate opinion is that in education, in energy, in ingenuity, in the bold adaptation of ways to means, and above all in the ambition and desire to excel on the part of the workmen, we are being outpaced by the Americans all along the line; and he is convinced that, unless some radical changes are made in the education of our commercial men, in the antiquated methods of our manufacturers, and in the character of the work both of the English master and man, we shall have to take the third place as an exporting country. As far as the masters are concerned, there are many evidences of a gradual awakening to the critical position of affairs; it is to the workmen's part in the struggle that Mr. Parker chiefly addresses himself—"the effectiveness of the personal element in our industries." No one, he says, can contend that in the province of labour the best effort is being put forth to maintain the national supremacy. While accepting in perfect good faith the statements that have been made by many of the Trade Unions that they are opposed to any effort on the part of workmen to curtail output or limit the production of machinery, and admitting that this practice may be confined to the more ignorant and to the minority, he has practical knowledge, and painful experience that cannot be gainsaid, in industries with which he is connected, that among many of the workmen there is a belief that to curtail the output is to the advantage of their class, and that industry is handicapped, development retarded, and trade driven away by such action. In so far as this is the result of a belief that in doing as little as possible men provide work for their fellows who are unemployed, Mr. Parker says the motive is to be commended. If a man thinks that by getting out of a machine double what he unaided could do he turns a fellow workman into the street, it is small wonder that he allows the machine to do little and bad work. That this belief is based on a totally erroneous foundation, however, Mr. Parker brings forward the following arguments to prove; and the advocates of the "wait-a-bit" policy will have a busy time if they attempt to refute his contentions.

In the first place, the theory presupposes that the amount of work, and the wages fund, are a fixed quantity; and that if one gets more, another must necessarily get less. There are over £60,000,000 of manufactured goods imported into this country upon which the labour element may be taken to constitute not less than 20 per cent. of their value. At least half of these imports might be made at home, if they could be made at a price, and if our workmen had the skill and inclination to make them. But, in addition to this, there is the export trade, which has no practical limit to its possible expansion. It is therefore quite clear that the work to be done is not a fixed quantity. Just, however, as it is capable of expansion, so also is it capable of contraction; and if the principle of doing as little as possible becomes the governing one in our workshops, this contraction will speedily show itself, and instead of the limitation of output furnishing employment for an additional number of men, it will defeat the end in view, and the result will be less work to be done.

In conclusion, Mr. Parker emphasizes the absolute necessity for masters and men pulling together, if the national industries are not to be allowed to dwindle and decay. Just so; the masters' interests are those of the men. The Warrington Chamber of Commerce have already formed a Conciliation Board in conjunction with the Trades and Labour Council; and the President suggests that a natural outgrowth and development of this would be the meeting of representatives of the masters and workmen to discuss subjects like the one to which he had alluded in his address. By an interchange of views of those who represent the two important personal factors in manufacturing, he says a better understanding might be arrived at on questions upon which unfortunately at present the two interests frequently hold different views and pull in opposite directions. It is to be hoped that the Chamber will see their way to act upon this suggestion. If the experiment should prove a failure, no harm will have been done; but if, on the other hand, success should attend the effort, a most important step towards the end that is so desirable for the welfare of employers and employed alike will have been taken. There would thus be everything to gain and nothing to lose. But whether or not this suggestion be adopted, we are hopeful that the address will not be altogether without result—that is, that it may induce some of those whom it concerns to take heed lest, by the pursuit of their present shortsighted policy, they one day find that they have "killed the goose that lays the golden eggs."

WATER-GAS TAR FOR BOILER HEATING.

In the "Journal" for Nov. 26 last, there appeared a full description of the Hydroleum Company's system of burning water-gas tar and other liquid fuel for the heating of boilers; and then, on the testimony at hand, we went sufficiently far to show our belief that this plan of utilizing one of the inferior products of works manufacturing carburetted water gas had ample recommending features. What was then said has been abundantly justified. Last week we were privileged to witness the operation of an application of the system to a Lancashire and a Babcock and Wilcox boiler at the Beckton Gas-Works; and, without pledging anyone on the works to an expression of opinion, we think it will be well within the truth to say that all who have the boilers under observation are perfectly satisfied with the performance of this new method of disposing of a portion of the production of water-gas tar.

As readers who have interested themselves in the previous article will know, the arrangement does away entirely with a bed of fuel under the boiler; the system being absolutely independent of any aid external to itself. Taking first the Lancashire boiler at Beckton, it is 30 feet by 8 feet, and is fitted with four of the burners or feeders. A pause may be made to say here that one of the beauties of the system is the studied care which has been taken to secure perfect combustion, and the maximum duty from the poor material dealt with. For the realization of these desirable ends, each burner is a unit perfectly free in action and control from its neighbours. Its position, the space allotted to it, the channels through which its flame plays, and consequently its air supply, are all arranged with mathematical precision; and the internal fire-brick work of the boiler, over and under which the combined flames play, is likewise measured to sizes which experience has determined to be the best. To proceed (and in doing so it is assumed that the reader has made himself generally acquainted with the principles of the system from the information already published), the steam required for the supply of the burners is taken from the boiler itself; and in the case of the Lancashire with which we are now dealing, it is reduced to 30 lbs. This boiler is situated under an overhead railway; and the water-gas tar is brought to it by trucks, and deposited into an elevated tank. In this it is allowed to remain during the night, so as to settle. The following morning it is transferred to a lower tank; and in this way the tar is relieved of a fair amount of water. Although the tar contains about 25 per cent. of water, the results realized are good. The consumption per burner varies, according to the duty required of the boiler. It is usually regulated to about 8 or 9 gallons per hour; but it has been worked up to about 12 gallons. The working, however, is not as economical when the burners are being run too fiercely.

Looking in the channels through which the feeder passes and through the sight-hole above, one can see nothing but a perfect and terribly fierce-looking mass of pure flame. The only doubt which this view raises is the effect of the violent impact of the flame on the arch which is sprung from side to side, and forms the dash-brick for the vapours to split against. With the system working with a furious vigour night and day, the arch has to be renewed about every three weeks; but in ordinary working it would last probably two months or thereabouts. Some new bricks are now being tried by the Hydroleum Company; and it is expected that these will be found more durable even than those at present in use. However, the renewal of this arch is a matter of small moment when it is considered that the boilers at Beckton are each answering the application of the new method of heating with a duty equal to one-and-a-half boilers working under ordinary circumstances. Another point is that steam is got up by means of this system in about 1¼ hours; and in this a great advantage will be recognized by those who know of the hours occupied in reaching this stage by the ordinary process of working. That the combustion is all that can be desired is shown by the fact that there is no smoke passing from the boiler; and the guarantee in this respect appears to be faithfully fulfilled.

What has been stated in connection with the Lancashire boiler applies in every way to the experience with the system in the Babcock and Wilcox 95-horse power boiler; the main difference in this instance being that it is only fitted with three of the burners. The whole of the fire-bars are covered with fire-brick. Removing the bricks from the sight-holes along the side of the boiler, flame is seen the whole of the 14 feet or so of the boiler's length. The tubes are clean on the outside; and the rapidity of the circulation inside has also had a beneficial effect. Although the evaporation is now about half as much again as previously, the average wear and tear on the boiler is no more than on a boiler with an ordinary coke fire. It must be conceded that the experience at Beckton is very favourable to the system, and will tend to promote its adoption.

AIR GAS FOR ISOLATED PLACES.

THE ordinary gas supply systems have not altogether covered the land; and nearly every provincial town is bounded on one side or the other with a portion of country containing scattered habitations, the supply of gas to which would not recoup the capital outlay required for the laying of a long stretch of mains. This being so, the occupiers of those houses have to find other means of artificially lighting them. Oil and candles formerly held sway for this class of lighting; but electricity and acetylene have now in some measure replaced those older and inconvenient methods. We also hear from Dr. Clowes that Professor Vernon Harcourt has lighted the billiard room at his country residence by a system of air carburetted by means of pentane; and, though Dr. Clowes did not say so, we believe that Professor Harcourt uses incandescent burners and mantles with his pentane mixture. Our readers have heard of other carburetted air-gas proposals time and again; and, after having received momentary publicity, most of those proposals have sunk into obscurity, which is doubtless the best and safest place for them. But Professor Harcourt's satisfactory experience is sufficient proof that air-gas systems are feasible, and may be in results perfectly efficient and advantageous for isolated premises, if properly devised.

Just recently, there came under notice a new air-gas proposal; and, being interested, a few inquiries were made. The arrangement itself has not been under inspection; but, speaking from the particulars furnished, it appears to be one which will be useful. Simply described, the method of carburetting the air is this: A Keith compressor, worked by the water from the ordinary house pipes or town mains, is used to force air through what is called the generator, but which we prefer to term the carburettor. This is charged with any suitable light hydrocarbon oil; and the air takes up as much of the oil as it can carry, and forms what we are told is an exact self-burning mixture. Of course, the whole arrangement is automatic. On igniting the air gas, the compressor commences its work; and when the lights are turned off, it ceases its action without further attention. The air gas is used in incandescent burners, just as Professor Harcourt applies his pentane gas at his country house; and it is stated that, by means of this air gas, burned with a "Gem" mantle, a light of 125-candle power is obtained, which is considered fully sufficient to illuminate a room 20 feet square. This is an exceedingly high candle power for such a small mantle; and it would be an interesting point to know at what pressure the air gas is delivered at the foot of the burner. The use of the compressor may supply the mixture to the burner at a higher pressure than would obtain with ordinary gas supply; and it may be this, or it may be something else, which accounts for the greatly increased power attributed to the "Gem" burner through using this air gas. There is another point. It is stated that "the economy of the system will be apparent when it is stated that this light [from the 'Gem' mantle] can be obtained at a cost of ¼d. per hour." We do not refer to this in any hypercritical spirit; but merely for the purpose of ascertaining from the makers—the Atmospheric Gas Company, Limited—exactly what that ¼d. comprises. Does it include interest on outlay, the cost of the water used in the compressor, the cost of the oil, and the expense of the mantles? Four hours' brilliant lighting for 1d. under the system seems almost too good to be true; but we are open to satisfaction on the point.

Among the other information to hand, it is mentioned that the air gas can be distributed about the house in the same manner as ordinary gas; that it can be used for a variety of purposes in the way of heating and power; that it is not poisonous; that there is no danger of explosion should an escape occur; and that a naked light can be carried with perfect safety into a room filled with the gas. Yet this gas can be used in a gas-engine! Incandescent gas lighting has for years been recognized as of value to the photographer in the absence of ordinary daylight; but the photographic results attributed to this light are described as very fine. In an illustration referring to its use for this purpose, a group of three incandescent burners are shown before a reflector; and in another circular alluding to the same subject, it is stated that "the consumption of oil with which the air is enriched is very small—less than 1d. per hour continuous burning." In view of the previous statement, we take it that this 1d. applies to the three burners. Gas managers are no doubt frequently asked to advise on the lighting of isolated premises; and to know of an air-gas system which they could depend upon, with satisfactory data as to cost, &c., would be useful.

EXTENDING THE EAST GREENWICH GAS-WORKS.

A PARTY of the Graduates of the Institution of Mechanical Engineers were received by Mr. Joseph Tysoe, at the East Greenwich Gas-Works of the South Metropolitan Gas Company, on Saturday afternoon. It was regarded as kind of Mr. Tysoe to give up his half holiday for the purpose; but, as he himself afterwards said, he was well recompensed by the keen interest which his visitors evinced in all that he had to show them in the colossal establishment under his charge. Mr. Tysoe personally conducted the party; and he proved himself to be a perfect paragon in kindness, and for the nonce a splendid tutor. He pointed out the features and peculiarities of the different parts of the huge plant, keeping as far as possible on the mechanical side of the operations, and answered all inquiries, throughout the best part of three hours, with patience and fullness. There is no necessity to follow the students through their inspection; the East Greenwich Gas-Works having become fairly well known to readers of the "JOURNAL." All that need be done is to refer to the extensions which are now in progress or in prospect.

The gas business in the South Metropolitan Company's district is unceasingly on the increase; and, during Saturday's inspection, it was not astonishing to hear that at East Greenwich during this winter the whole of the four large retort-houses, each containing 450 20-feet retorts, have, with the exception of five beds, been fully occupied. Small wonder then that the walls of the fifth large house are being rapidly erected. In design, the house itself will be similar to the old ones, but as to what will be the character of its equipment we have no information at present. The house is 480 feet long and 70 feet wide; and the floor consists of one huge mass of concrete, which, owing to the peaty nature of the land hereabouts, it was necessary to make 20 to 30 feet deep. The side walls of the house are also being largely built of concrete; this being found much cheaper than brickwork. The house is intended for an output of 6 million cubic feet per day; but retorts equal to only 2 millions will be installed for the coming season. At East Greenwich, each retort-house has its own auxiliary plant; and therefore each house and the plant right away to the station meters really forms a gas-works complete in itself. The new house will also have its own complete system of exhausting, condensing, washing, and purifying plant. As nothing but the fabric of the house has been started, there will be busy times at the station before next winter comes upon us.

During the inspection of the old retort-houses and the drawing and charging machinery, it was remarked that the mouthpieces in one of the houses were particularly clean in comparison with some of the others. Looking along the benches, there appeared to be absolutely no leakage from any of them; and had there not been men in the place, a casual visitor might have passed through without observing that the work of carbonization was proceeding. Inquiry disclosed the fact that the mouthpieces which were doing such admirable duty were Mr. Tysoe's own patent.

Then it was seen that new sulphate of ammonia and sulphuric acid works are being erected on the land, at the eastern end of the works, formerly occupied by Messrs. F. C. Hills and Co. When this was taken over by the Company in 1897, the acid plant was in a very dilapidated condition; but it was pulled together a bit, and about 7000 to 8000 tons a year have been made with it, under somewhat adverse circumstances. The ground has now been laid out by the Company's Chief Engineer (Mr. Charles Carpenter) for the erection of six separate units for making 100 tons of acid per week each, and six units for producing 170 tons of sulphate of ammonia per week each. The first of these acid units is now being started; and the first sulphate of ammonia unit is well-nigh completed.

About this part of the new plant the visitors spent some time; being hugely interested in the four large leaden chambers connected with the acid plant, and which are 110 ft. by 20 ft. by 17 ft., and constructed of lead weighing 7 lbs. to the foot. On the way to the sulphate plant, a stop was made to examine three double-

flued Lancashire boilers, 27 feet by 8 feet each. In the sulphate houses, the immense saturator, which is being constructed by the Chemical Engineering Company, and will be capable of making 25 tons of sulphate per day, was the subject of much inquisitive inquiry. Into the saturator, two ammonia stills will work. The salt will be taken from the saturator by means of a Wilton discharger, be delivered into a centrifugal machine, then distributed, by means of elevators and conveyors, into the stores, and there automatically weighed into bags. The elevator and conveyor work is being carried out by the New Conveyor Company. In the adjoining engine-house, the foundations are being got ready for the reception of a 40-horse power Cornish engine, which is being made by Messrs. Bryan Donkin and Clench. Outside the buildings large provision is being arranged for water-softening plant for the boiler-feed.

Arriving towards the close of the visit at the repairing-shops, the young mechanicians found machinery of a type which comes within their own particular daily work. With thirteen locomotives, stoking machines in all the retort-houses, and the innumerable pumps, cranes, gas-engines, and other machines about the place, the repairing-shops are an important part of the establishment, and are responsible for a large slice of the weekly expenditure on wages. The previous long stretch of these shops has recently been added to; and improved wood-working machinery has been introduced. A new Crossley gas-engine of 16-horse power is being fixed for driving the machine tools in one of the shops; and additional machine tools will shortly be provided. The inspection of the spacious and splendidly arranged shops afforded no little delight to the visitors.

An engine pumping water from the river for use on the works, and the settling tanks came in for a few minutes' examination. Approaching the end of their perambulation of the works, the party came to the jetty; and some of them heard that it has been decided to make a T head in place of the present ⅂-shaped structure; and the new portion will be fitted with improved appliances in the way of grabs, &c. The work will probably be commenced shortly.

With kindly thoughtfulness, Mr. Tysoe had tea provided for his visitors. He himself sat at the head of the table; and, before they left, he received an expression of the warm appreciation of his guests, which brought from him the remark that, though the party was not a numerous one, the members had evinced such a desire to gain knowledge of the works and operations that he did not consider his afternoon had been by any means ill-spent—indeed, he had derived immense pleasure from it.

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see p. 434.)

THE most engrossing business in the Stock Exchange last week was the fortnightly settlement, which was very heavy, especially in the South African market, where speculation has been rampant as the prospect of a speedy termination of the war seemed to be coming more within view. Thus fresh business was not at high pressure. On the whole, the tendency was favourable, though it was not uniformly regular throughout. The best factor for firmness was the Anglo-Japanese agreement, which was well received after some cogitation. Consols were rather easier, but elsewhere prices were almost all higher. In home rails, they were quite run away with, on the strength of *ex parte* reports on an invention which is as yet in the experimental stage. In the Money Market, there was a strong demand, especially for the Stock Exchange settlement; but discount rates were inclined to be easier. In the Gas Market, business was decidedly quieter than it had been in the previous week, though even that itself had not been remarkably brisk, and no single issue could show more than a very limited degree of attention bestowed on it. There were, however, a good many changes in quotation, none of them being of large proportions; and all the alterations but two were in the upward direction. One of the issues which went the wrong way was Gaslight ordinary, which opened rather weak at 97, and though it touched 98 the next day, it fell back again the day after that, and lost a point after being quoted *ex div.* The final mark was 95, which is equal to 97⅛ with the dividend in it. Very moderate business was done in the secured issues; and they were steady enough. South Metropolitan was inactive on the whole. It looked as if it were going to fall, being done at 126; but a transaction *ex div.* was marked at 124¾, equal to 127¼ with the dividend in it. Commercials were quite unnoticed. Business in the Suburban and Provincial Group was very slender; and the only variations in the London market were those resulting from *ex div.* corrections. But locally, Newcastle had a rise. In the Continental Companies, the weakness which was noticeable in the previous week made its effect felt by dropping Imperial down a couple of points; but the others did not move. Among the remoter undertakings, Sydney and Melbourne bonds and Buenos Ayres and San Paulo were higher. In the Water Companies, business was moderately active. The big advances recently made in quotations were liberally pruned down, Chelsea, Grand Junction, and West Middlesex having a 10 per cent. setback; and others following suit in a lesser degree.

The daily operations were: Gas on Monday was quiet and unchanged. In Water, West Middlesex fell 5, Southwark 2, and East London 1. Gas moved more freely on Tuesday. Sydney and both Melbourne bonds rose 1 each, Buenos Ayres ¼, and San Paulo ½, but Imperial fell 1. In Water, Lambeth receded 2, and Southwark 1. On Wednesday, Gas did not move; but in Water, Chelsea fell 5, and Grand Junction 2. No change in Gas on Thursday; but in Water, Chelsea relapsed 5. On Friday, Gaslight ordinary fell 1. In Water, West Middlesex dropped 5, Grand Junction 3, and Lambeth 1. Saturday was very quiet. Imperial receded 1. In Water, Lambeth fell 2; but New River rose 2½.

OBITUARY.

CHARLES SELLERS.

There will, we are sure, be a feeling of sincere regret with a large number of our readers when they see the announcement which it is our painful duty to make to-day, that the long and useful life of Mr. Charles Sellers, of York, came to a close last Tuesday morning, at his residence, "Amor Matris," in that city. It may be remembered that Mr. Sellers had been for some time confined to his room; and at the recent half-yearly meeting of the Company with which he had so long been associated, Directors and shareholders united in expressing sympathy with him in his illness. To this, however, he succumbed not many days later—within a few weeks of the 73rd anniversary of his birthday.

Mr. Sellers was a native of the Wold village of Fridaythorpe; but while he was still a boy, his parents left their rural home and settled in York. When the time came for him to make a start in life, an opening was found in the offices of Messrs. Grayston and Earle, sharebrokers, with whom he remained till he was 21 years of age, when he entered the service of the York Gas Company. From a subordinate position, he advanced to that of Chief Clerk; and in 1868 he was appointed Secretary and Manager, in succession to Mr. Joseph Braddock (from whom doubtless he received his early training), who had held these offices since 1844, when the amalgamation of the two Gas Companies who previously supplied the city took place. Mr. Sellers discharged the combined duties till July last year, when he retired, after 52 years' service, and was selected to fill a vacancy on the Board, in order that the Directors might have the benefit of his advice and experience. In responding, as the junior member, to the vote of thanks accorded to them on the occasion of the first meeting after his election, he said: "I have done my best; but my work has been a labour of love." We verily believe it. Under his management, the York Company were the first in England to sell gas at 2s. 6d. per 1000 cubic feet; and for many years they were in the foremost rank as suppliers of low-priced gas.

In the domain of gas, Mr. Sellers was a conspicuous figure. He joined the British Association of Gas Managers in 1874, and remained with that body after it became the Gas Institute. Until recently, he was a regular attendant at the meetings; but he was more of a debater than an author. In 1879, however, he read a paper on "The Best Means of Utilizing Coke," in which he set forth the advantages to householders of gas companies selling this valuable residual product broken into a convenient size for use. It was in the troublous period in the history of the organization between 1885 and 1888 that Mr. Sellers' powers as a debater were displayed. Those times have happily passed, and they need not now be referred to except for the purpose of making one explanation in which we are personally concerned. In the war of words which then took place, Mr. Sellers applied to himself—erroneously, as he afterwards acknowledged—an expression which appeared in our columns; and it is pleasant to reflect, now that he has passed away, that thenceforward his feelings towards the Editor of the "JOURNAL" were of the most cordial character. In taking the prominent part he did in that controversy, we believe he was actuated solely by the desire that no injustice should be done. We need say no more on this topic than this, that the three gentlemen chiefly concerned—Mr. Sellers, Mr. Bray, and Mr. Livesey—were present at the meeting of the Institute in 1899, and that the old friendship which had subsisted between them, in which, as Mr. Livesey said, there had never been any interruption, was strengthened, and has only been broken by death. Mr. Sellers was one of the founders of the North of England Gas Managers' Association, and filled the office of President in 1883. It will be remembered that about two years ago he, in company with Mr. J. H. Cox, of Sunderland, was presented with a congratulatory address on completing his Jubilee with his Company.

On the occasion just referred to, Mr. Sellers, in acknowledging the gift, mentioned—we always thought with a feeling of regret—that he had no family to rejoice with him on receiving it, and to cherish it as an heirloom when the time came for him to relinquish possession. Mr. Sellers, as most of his professional brethren are aware, was a bachelor, and made his home with his venerable mother, who died a few years since. Of her he always spoke in terms of the greatest affection. She rejoiced in his prosperity, and shared with him the care—we might almost say paternal care—of the workmen of whom he had the supervision. The distributions of gifts for the men, their wives, and their children, which were such pleasant features of Christmas time at the York Gas-Works under the management of Charles Sellers, will not soon be forgotten by those who took part in them; nor, we venture to think, will the excellent advice, united to good wishes suitable to the season, by which they were accompanied have

been given in vain. The example of filial affection, temperate living, and steady devotion to duty constantly before the workmen in the person of their chief, cannot but have had an elevating effect. Mr. Sellers gave up the whole of his working life to the service of his Company, and took no part in public affairs. He was, however, keenly alive to the value of popular education, and strove earnestly to extend its benefits. In his younger days, he was one of the Honorary Secretaries of the Institute in St. Saviourgate, York, and in 1872 was presented with his portrait and a piece of plate in recognition of the services rendered by him in that capacity.

The funeral took place on Friday, at the native village of the deceased. The procession left his residence shortly after nine o'clock. Some two hundred of the Company's employees had assembled at the house, and many of them accompanied the *cortége* to the railway station. The body, enclosed in an oak coffin, was borne to the train between lines of the Company's workmen. All the Directors of the Gas Company were present, with the exception of one, who was indisposed. The mourners travelled to Fimber Station, where the body was transferred to a hearse; and the procession began the long climb up the snow-clad wolds to Fridaythorpe. The village was reached shortly after noon; and the majority of the villagers, young and old, to whom Mr. Sellers was well known, assembled in the roadway. The Vicar of Fridaythorpe (Rev. Anthony Bathe) received the body at the entrance to the churchyard, and preceded it into the quaint old Saxon Church, where the "rude forefathers of the hamlet" have worshipped for quite a thousand years, After the Vicar had read the office, the bearers, who were all old servants of the Gas Company, again took up their burden, and bore it to a corner of the churchyard, where a grave had been dug next to that of the deceased's mother. Round the grave, which was lined with evergreens studded with white flowers, stood the school children of the village. Upon the coffin rested several wreaths and floral offerings. Among the professional friends of the deceased who attended the funeral were Mr. M. Leaf (the present Engineer and Secretary of the Company), the heads of the different departments, and representatives of the staff, Mr. T. Newbigging, Mr. Matt. Dunn (President of the North of England Gas Managers' Association), and Mr. C. H. Parkinson.

We regret to learn of the death of Mr. W. Cheyne, who a few years ago relinquished the position of Manager of the Briton Ferry Gas-Works, on account of impaired health. He was 74 years of age.

Mr. Alexander M'Laren, an ex-Magistrate of Glasgow, and for some years Convener of the Gas Committee of the Corporation, died at his residence in Pollokshields on the evening of Saturday, the 8th inst.

Maldon has just lost, by the death of Mr. William King Digby, in his 87th year, an old resident and a highly respected public servant. The deceased gentlemen held the position of Borough Treasurer for thirty years; and he was also Chairman of the Gas Company, in whose affairs he took keen interest up to the last.

The death occurred recently, at the age of 57, of Dr. Walter Wykesmith, to whose energy and influence the formation of the Wimborne Water Company was largely due. He was Chairman of the Board, and only a few hours before his death he was re-elected a Director. Deceased was highly esteemed in Wimborne, and was well known in Masonic circles.

PERSONAL.

Mr. Frank W. Carlow, Manager of the Bonnyriff and Lasswade Gas Company, has been appointed Manager of the Renton Gas Company.

At the last monthly ballot at the Institution of Civil Engineers, Tojiro Sano, of the Kobe (Japan) City Water-Works, was elected an associate member.

Mr. William Dunn, who has been Manager of the Thorne Gas-Works for four years, has been chosen out of 54 candidates for the managership of the Queenstown (Ireland) Gas-Works.

At the meeting of the Carlisle Town Council last Tuesday, the recommendation of the Gas Committee that Mr. W. J. Smith, B.Sc., Assistant-Manager at the Bolton Gas-Works, should be appointed Gas Manager was unanimously confirmed.

Last Friday, Mr. Arthur Botteley, who is leaving the Stoke-upon-Trent Gas-Works to take a position at the gas-works of the Leek Urban District Council, was the recipient of a case of books relating to gas engineering and a piece of silver plate, presented to him by the employees. In making the presentation, the Engineer and Manager (Mr. W. Prince) said he trusted Mr. Botteley would have continued success in his new sphere. In a few well-chosen words, Mr. Botteley acknowledged the gifts.

We are gratified to be able to add a personal item to the particulars given in last Tuesday's "Journal" in regard to the Derby Gas Company's undertaking. At the assembly of the Directors held prior to the annual meeting, it was unanimously decided to grant Mr. J. Ferguson Bell, the Engineer, a very substantial increase of salary, to date from the beginning of the year. The Chairman of the Company (Mr. H. Swingler, D.L.) expressed, on behalf of the Board, their satisfaction at the manner in which Mr. Bell had discharged his duties the last eighteen months.

On Monday evening last week a presentation was made to Mr. George Haynes, late Assistant Manager at the Linacre Station of the Liverpool Gas Company, on his leaving, after seventeen years' service, to take the appointment of Manager at the Caryl Street station, Toxteth Park. The workmen at Linacre raised a subscription and purchased for him a handsome silver-mounted ebony walking-stick, with a suitable inscription, and deposited the balance in a purse. These were presented to Mr. Haynes, in the presence of upwards of 200 workmen, by Mr. Charles Eastwood, the Manager. The foreman, Mr. William Wright, who had the whole matter in hand, ably carried out his duties as Chairman. Mr. Haynes was also the recipient of two pipes, a tobacco-pouch, and a silver match-box from another section of the works. He has left with the best possible wishes from the men.

At the meeting of the Carlisle Town Council last Tuesday, the recommendation of the Gas Committee that Mr. W. J. Smith, B.Sc., Assistant-Manager of the Bolton Corporation Gas-Works, should be appointed Gas Manager, in succession to Mr. C. B. Newton, came up for confirmation. The Chairman of the Committee (Mr. Corbett), in moving a resolution to this effect, explained that they had had 29 applications for the appointment, and reduced the number to five, from whom they finally selected Mr. Smith. A deputation had been to Bolton and had had an interview with the Mayor (Alderman Miles), who had spoken very highly of the selected candidate. He had been for four years and a half at Owens College, Manchester, where he took his degree; a year and a half at the Widnes Alkali Works; and a similar time with Messrs. R. & J. Dempster, Limited. He was 29 years of age. Mr. Coulthard, in seconding the motion, stated that Mr. Smith's testimonials had been verified to the fullest extent. The recommendation was unanimously adopted; and Mr. Smith was called in and informed of his success. In a few appropriate words, he returned thanks for his election.

A pleasant gathering took place at the Mason's Arms Hotel, Middleton, on the 7th inst., to afford an opportunity for the employees at the gas-works of the Corporation to testify their respect for Mr. Tim Duxbury, who is relinquishing the management in order to take up similar duties at Oldham. Mr. John Jessop presided over a large gathering. Alderman Walker (the Chairman of the Gas and Electricity Committee) and the Chairman, having referred in appreciative terms to Mr. Duxbury's continuous efforts, during his eleven years' occupancy of the position of Manager, to ensure the success of the undertaking, Mr. John Cooper was called upon to ask him to accept a present for which the men had subscribed, accompanied by their best wishes that he might be successful in the future, and that he and Mrs. Duxbury and their family would have good health and long life. Mr. Cooper then handed to Mr. Duxbury a very pretty barometer, bearing the following inscription: "Presented to T. Duxbury, Esq., by the employees, as a token of esteem, on his leaving the Middleton Corporation Gas-Works, Jan. 31, 1902." Mr. Duxbury, in acknowledging the gift, said he had never seen a better class of workers than those at Middleton, for they worked not only for themselves but for the town generally. He had testified to this not only in Middleton, but in London and elsewhere. He was proud to hear the expressions in regard to himself which had been used by the Chairman and Mr. Cooper, for he knew they were fully meant. In return, he would wish the company, collectively and individually, every possible success. Mr. E. Wellens, the Assistant-Manager, said he believed they had secured a worthy successor to their esteemed late Manager; and if they all pulled together, he had no doubt the connection between Mr. Anderson and the gas workers would be a happy one.

Manchester and District Junior Gas Association.—This Association, which was inaugurated only about three years ago with the object of devising means for helping and extending the technical knowledge of its members, has, from very small beginnings, achieved quite a remarkable success. Starting with about half-a-dozen young men from the "Gas Manufacture" class at the Manchester Technical School, the Association now numbers upwards of 60 members, who are not only students in the profession, but gas managers and others occupying high positions in connection with gas production and engineering work generally. The papers and discussions at the sessional meetings, which are fully reported in our columns, furnish further evidence of the useful work being done by the Association.

The Utilization of Blast-Furnace Gases for Power.—There appears to have been another Richmond in the field, says the "Iron and Coal Trades Review," before Mr. B. H. Thwaite, in 1894, promulgated his theory of the application of blast-furnace gases to the driving of gas-engines. Herr Fritz W. Lürmann, of Osnabrück, has issued a circular letter, in the course of which he claims that he "expressed the idea of the employment of blast-furnace gases in gas-engines on May 2, 1886, at a meeting of the Westphalian District Union of German Engineers;" and he sent to our contemporary a reprint from the "Proceedings" of that Society in proof of the claim. The point, however, is: Who was the first to apply the idea in successful practice? It is generally supposed that Mr. Thwaite stands in this position in respect of his first installation at the Wishart blast-furnaces of the Glasgow Iron and Steel Company.

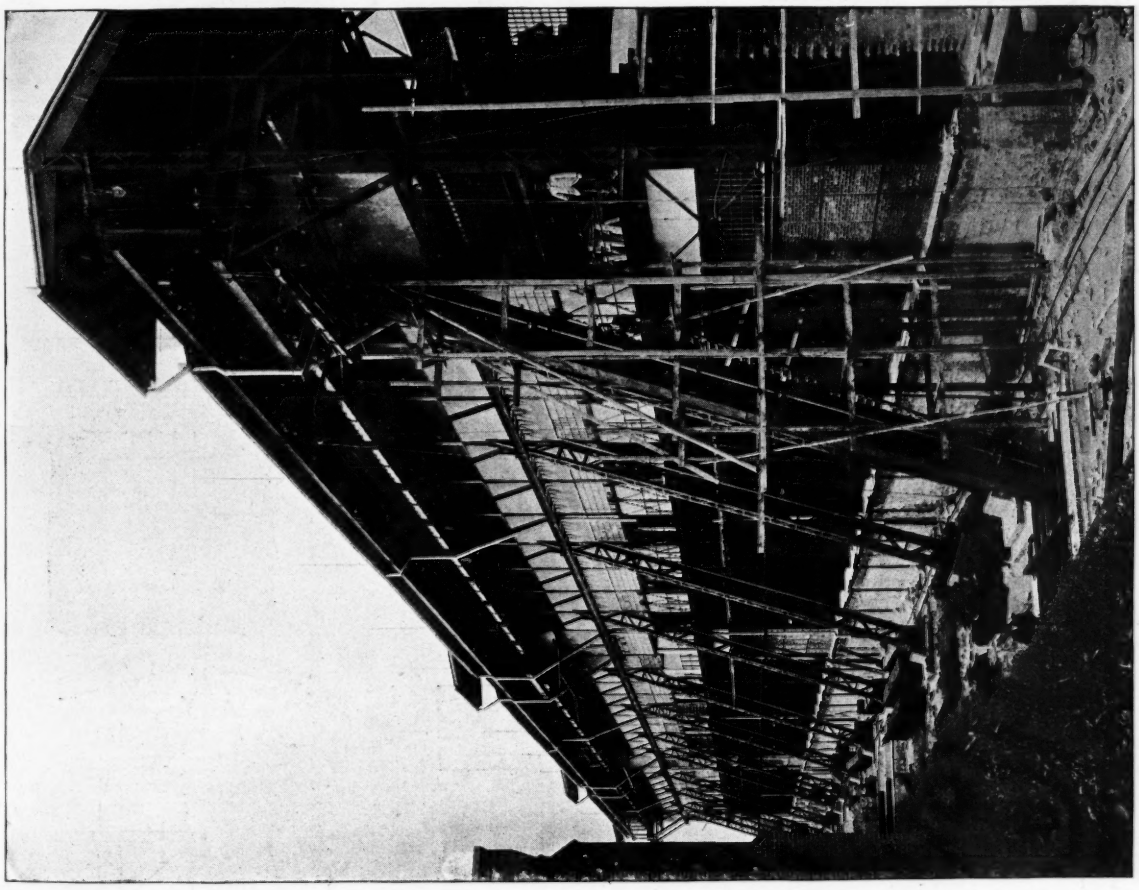
COMMUNICATED ARTICLES.

CRITICISMS ON CONSTRUCTION OF COAL AND COKE HANDLING PLANT AT ZURICH GAS-WORKS.

By Archibald Little.

(*Concluded from p.* 344.)

The accompanying drawing and photographs are intended to supplement the articles in the last two numbers of the "Journal" to illustrate what I wished to make clear regarding the difference in the designs of the various parts of conveyors and elevators which obtain on the Continent and in this country. First attention is invited to the fig. 3, which shows the general arrangement of the coal-handling plant. The whole of the plant, it will be noticed, is in duplicate; there being two 15-inch elevators to each bench—one at either end. Each elevator delivers coal at the rate of 18 tons per hour to a 15-inch wide Little's patent push-plate conveyor. Each elevator has fixed over the bottom boot a four-roll crusher, and a large capacity hopper to feed it. The only belts on the plant are the main belts from the engines, and those driving the crusher counter-shafts; all other "drives" are positive, by means of toothed wheels and shafting. The carbonizing plant consists of two benches of ten beds each, 12 ft. $9\frac{15}{16}$ in. centres, containing nine retorts $20\frac{5}{8}$ in. wide. The coal for feeding them



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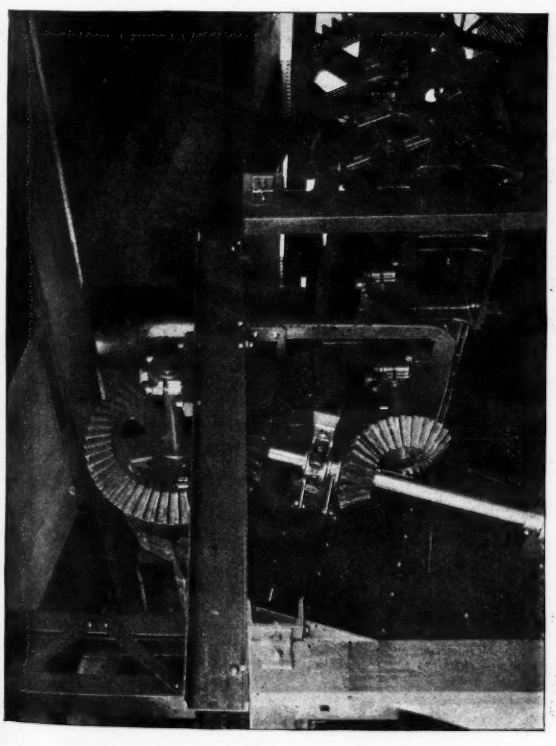

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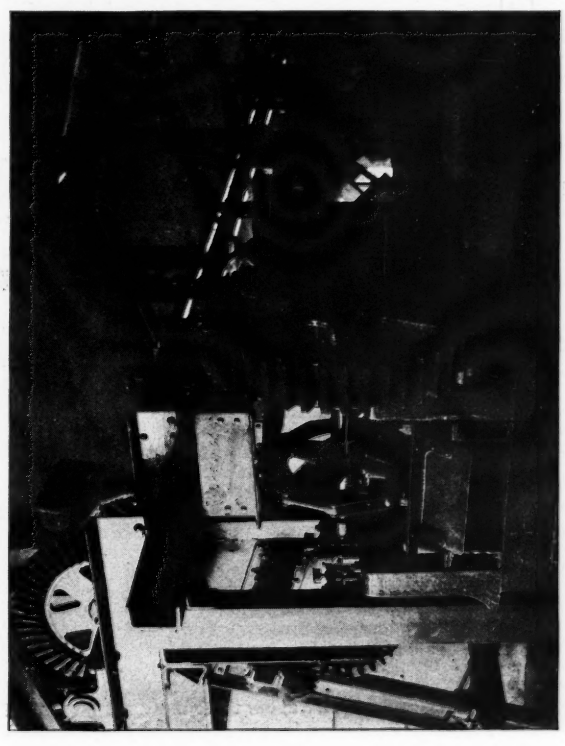
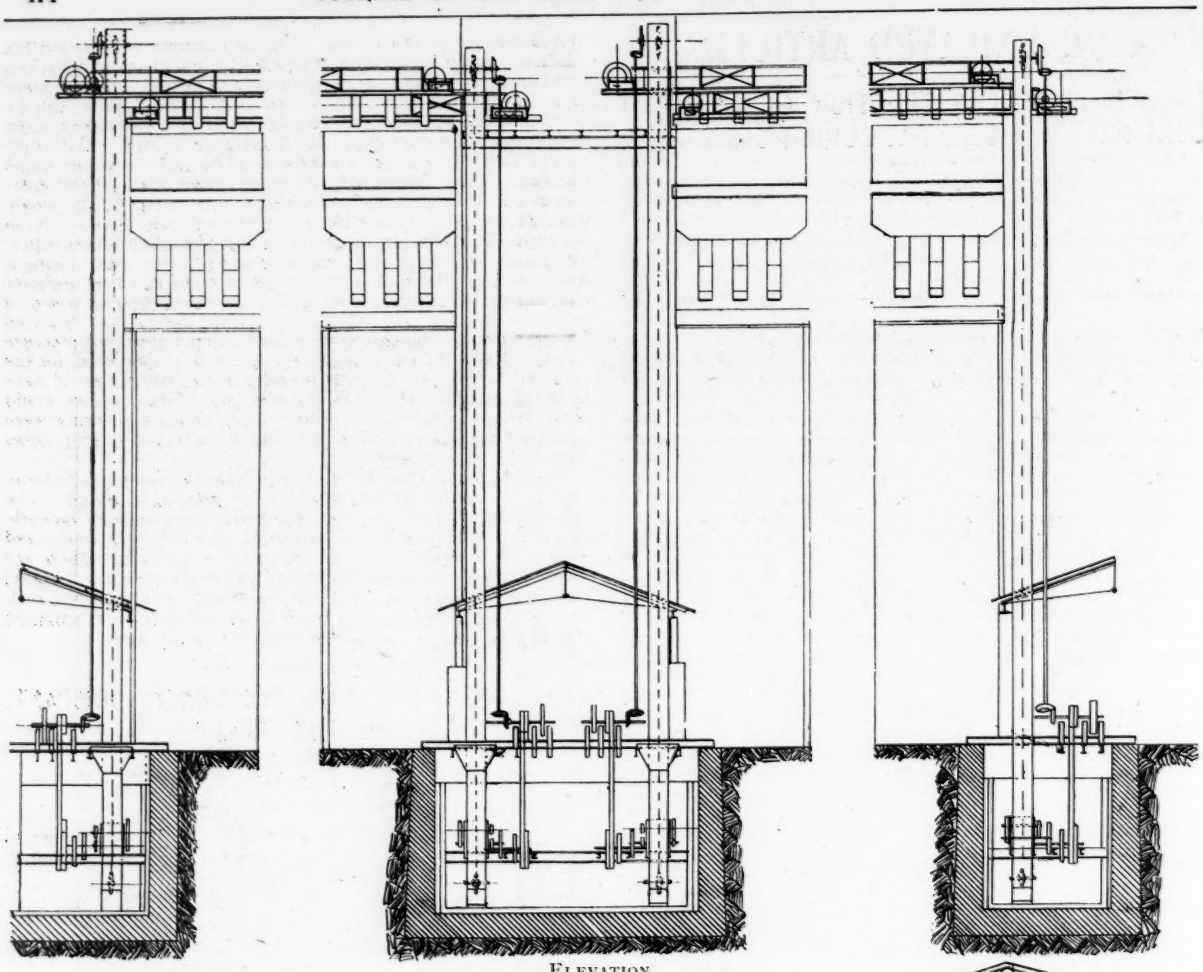
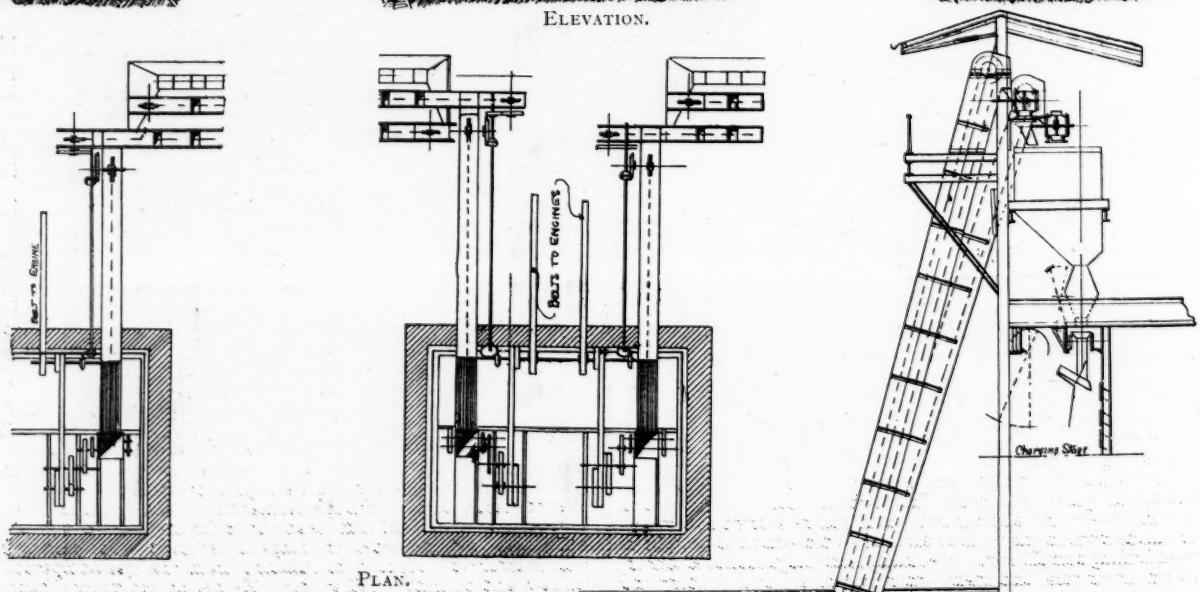


No. 2.

THE COAL CONVEYORS AT THE BREMEN GAS-WORKS.



ELEVATION.



PLAN.

CROSS SECTION.

AUTOMATIC MACHINERY FOR INCLINED RETORTS AT THE BREMEN GAS-WORKS.

is contained in continuous overhead tanks, fitted with three separate shot-pouch measuring chambers to each bed. All these arrangements are clearly shown on the drawing; and if figs. 1 and 2 are examined, a good idea will be obtained of the strengths and details of the various parts. No. 2 should be compared with illustration No. 7 which accompanied the Zurich article, and a note made of my remark concerning the bad design of the conveyor at that works, with especial reference to the end stools and wheels, as well as the elevator casing and structure. Fig. 2 similarly offers a good opportunity for a comparison of the designs of chain and end wheels, and of the detachable push plates and conveyor framing. Fig. 3 shows most distinctly the peculiar form of retort-house decided upon for the Bremen Gas-Works, and incidentally it illustrates one elevator erected and the twin-pit at the centre of the side wall in which the central elevators were about to be fixed.

The method of operation is as follows: Coal-trucks are brought on rails to underground hoppers, made of ¼-inch steel plates, joined at the corners by means of 3½ in. by 3½ in. by ⅜ in. steel angles, and further stiffened with 2-inch angles. Over the hoppers are fixed screen bars, which allow small coal to bye-pass the crusher, and go direct to the elevator; at the same time directing the large coal into the crusher. The coal is shovelled from the waggons into the hoppers; but this system is only of a temporary nature, as provision has been made to allow for the introduction of feeder conveyors.

Each of the four crushers consists of cast-iron sides and ends, with removable heavy bearings bolted on to the side brackets to carry the 4-inch square steel shafts, on which the cast steel crusher claws are strung. There are four of these shafts, and they are geared together with 5-inch face spur wheels; and the whole has force and motion applied through a train of wheels and shafting, driven by a 6-inch belt from the main shaft. Steel shoots made of 3-16-inch sheets direct the crushed coal to the elevators.

The elevators are of the dust-proof type, made with steel casings, consisting of plates 11 B.W.G. thick, joined with 1½-inch angles, and stiffened with 2½ inch steel angle guides, which carry and guide the buckets. The buckets are 15 inches wide, seamless pattern, with reinforced fronts made from ⅛-inch steel spaced 2 feet apart on the single 6-inch pitch chain. Each has fixed on the back a 3 inch by ⅜ inch skidder bar, which slides on the guides. Two of the elevators are 82 feet between the centres of the end shafts; and the other two are 83 ft. 3 in.—all set at an angle as shown in the photograph. They work at 80 feet travel per minute, and raise 18 tons per hour; the two former delivering to the conveyor over the centre of hoppers, and the latter to the higher conveyors.

The conveyors are of the push-plate design; two of them being 132 ft. 6 in. long, and the other two 132 ft. 11 in.—each provided with thirty discharge outlets, fitted with regulating slides. The troughs are built of two channels, back to back, 15 inches apart, with a ⅜-inch steel bottom plate rivetted to the underside flanges. From this continuous trough are built 4 inch by 2½ inch angle uprights, about 5 feet apart, braced with 1¾ inch by ⅜ inch flat bar, and ¾-inch cross stays. This frame has rivetted to it the longitudinal 2½-inch angles, which carry the return push-plates. The push-plates are Little's patent 1893 design, 15 inches wide, consisting of $\frac{3}{16}$-inch plate 15 inch by 6 inch rivetted to a cast steel frame, which also carries the renewable skidder bar. The frames are secured to the single 6-inch pitch by 1½ inch chain, at 2 feet pitch; and the conveyor working at 80 feet per minute is capable of doing duty slightly in excess of the elevator.

The coal from the push-plate conveyors goes into the two continuous hoppers, which are shown in the drawing; and these were supplied and fitted by the Bremen authorities. Under the hoppers are sixty shot-pouch measuring-chambers, each with a capacity of 5 cwt. of coal, and they are complete with levers and supports made to the design well known in this country. All the structures for carrying the elevator heads and ends of the conveyor were made in this country.

FUEL VALUE OF PETROLEUM OIL AND MOND AND OTHER PRODUCER GASES.

By Thos. Fletcher, F.C.S.

Although large numbers of oil cooking arrangements are made and used, they are a very poor substitute for coal gas, where it can be obtained. But so many improvements have been made within the last few years, that it is not safe to say where the end will be. The lighter petroleums, benzoline, naphtha, and gasoline are, in this country, not considered safe as fuels for ordinary and domestic purposes, and a very few years ago a burner which would consume ordinary petroleum oil, with a hot, clear, blue flame, was quite unknown. This difficulty has now been satisfactorily overcome, and burners which can be started in a minute are made both in this country and in Sweden—their use extending from boiling a small kettle to working fairly large furnaces, driving steam motor-cars, and many other purposes. It is evident that these burners have come to stay; and it is not certain that the highest point of perfection has been attained. The application of this fuel is too new to permit us to suppose the end is yet reached. Taking the best burner for petroleum oil at present known, a little practice is needed to start it entirely without smoke or mess; and they are all more or less noisy in use. A silent blue-flame petroleum burner has yet to be invented.

Looking at the matter as it stands, I have recently been making some experiments with petroleum oil and coal gas, under precisely the same conditions; and I find that in boiling water in bulk, at the rate of a gallon in 2½ minutes, one pint of petroleum, such as is ordinarily used for lamps, has a fuel value equal to 40 cubic feet of 18-candle gas. Practically, the gas at 2s. 6d. per 1000 cubic feet, is equal to petroleum at 10d. per gallon; and this proportionate value may be taken as a standard in working practice with the best burners. It is well to know that, whatever improvements are made in petroleum burners, the question of cost of the two fuels can never set coal gas aside; and as regards simplicity, convenience, and cleanliness, gas has decidedly the advantage.

With regard to Mond, and other such gases, we are putting down an experimental plant for testing these against coal gas, and I hope shortly to be able to give a complete series of comparative tests for all purposes to which these gases can be applied. The figures and prices given in the statements of the various inventors require a very large grain of salt added; they simply state the cost into the holder. If the gas companies could give this as their future price, it would make many of the statements of their coming competitors look exceedingly small. Possibly Mr. Isaac Carr will give us the net cost price of gas in the holder at Widnes without any charges for distribution, superintendence, free street lighting, payment to rates, office charges, &c. We must also take into consideration the fact that ordinary coal gas has, in practice, at least four times the heating power of producer gas, and also the larger mains, meters, &c., required for the latter. Though much is said about the higher pressure at which the so-called "cheap" fuel gas will be delivered, for the same work done the pressure of one inch for coal gas would have to be increased to 16 inches for fuel gas. This pressure would mean an unbearable noise at the outlet, unless a governor were used, and the meter and pipes from it increased to four times their ordinary capacity.

It will be noted that the fuel value given above for petroleum oil is very much higher than I have previously stated. The difference is caused by the enormous improvements recently effected in burners, the best of which may safely be compared with the most perfect atmospheric gas-burners made. There are now in use for petroleum oil several patterns entirely automatic, requiring no blower or attention, which will melt cast iron with ease in an ordinary crucible furnace—a result not yet attained with coal gas, except on a very small laboratory scale.

GAS COMPANIES, THE WELSBACH COMPANY, AND THE TRADE.

By Norton H. Humphrys, Assoc.M.Inst.C.E., F.C.S.

(*Concluded from p.* 346.)

So far as the trade is concerned, they would probably prefer to sell a million mantles a year at a profit of 3d. each rather than 4 millions at a profit of 1d.; and so far they are in accord with the wishes of the Welsbach Directors. But gas companies hold different views, because they have no monopoly corresponding to the Welsbach patent rights. They cannot control the trade in light, in a manner similar to that essayed by the Welsbach Directors, who seem to imagine that they can set the tune with regard to the price of incandescent burners and mantles. The public have the offer of other illuminating agents; and the trade would just as soon sell them petroleum lamps or electric fittings, as Welsbach goods. In fact, it is quite news to most gas managers that the trade have been so enthusiastic in the matter of these things. Is it a fact that the average trader has taken a special interest in the system, or has done more than supply goods to order, and run a stock of the things in demand, just as he stocks other goods? While the trade do not trouble, the gas companies naturally object to see the adoption of a really good appliance limited and prejudiced by being sold at an abnormally high price. They have never objected to pay reasonable prices for the various appliances they require; and the Welsbach Directors are the first to suggest that gas companies are sweaters. They have no wish to restrict fair and reasonable profit, but are not unreasonable in objecting to a loading of 500 per cent. on the cost, and in suggesting that if the comparatively small "infringer" finds it worth while to incur the risk of prosecution in order to sell at 3d. each, a large and powerful corporation should be in a position to supply on equal terms. The usual complaint in regard to all kinds of manufactured articles is that the large concerns eat up the small ones. The retailer in a small way says he cannot compete with the Stores; and the back parlour operative complains that the large factory, with special machinery and organization in every department, cuts him clean out of the market. But in this particular case the order of things is reversed. The infringer will scarcely be accused of suffering from the gas companies' disease and desiring to sell at cost. He has no prospective benefits to look for, and even the chance of a second order is problematical; so the price paid for the article covers the whole of his profit. The chances are that his very existence is a proof that mantles at 3d. each leave a good margin of profit. Yet he offers his wares at about half the price on which the Welsbach Directors have failed to earn a dividend; and we have the remarkable spectacle of the large seller finding it necessary to invite the terrors of the law to enable him to keep a position in the market.

The trade have not been slow in appropriating and seeking to make capital out of the adulatory phrases of the Welsbach Directors, who could very well have recognized the special services undertaken on their behalf by that indefinite body, without going out of their way to cast mud at gas companies. But if the gas companies have done nothing, it follows that the trade have done everything that has been done in the way of building up the business; and the Directors, in avoiding the Scylla of gas companies, may fall into the Charybdis of the trade. In fact, they have already done so to some extent, as shown by the reference to a "remonstrance" which has caused them some perturbation.

They do not want to make rash advances to gas companies; but the attitude they take up offers direct encouragement to united and representative action on the part of the trade, which may possibly be developed to a sufficient degree to prove a source of embarrassment in the future. They may eventually find themselves in the position occupied by certain classes having labour to sell, and who, in seeking to secure independence in respect to their customers—the capitalists—have placed themselves completely under the thumb of the Trade Union officials. As it is, they tacitly admit that the party who has made 85 per cent. of the business is entitled to lay down the law with regard to the remaining 15 per cent.

It is rather amusing to notice that, while the Welsbach Directors charge gas companies with hostility towards any and every improvement in gas appliances, the trade rush to the other extreme, and accuse them of being eager to deal in anything and everything, and apparently with no other object in view than that of robbing "the poor ironmonger of his discount." The complaint of the trade appears to be that the gas companies ought to be satisfied with their rights in respect to the sale of gas, and not seek to add to their already enormous profits (?) by entering upon the sale of appliances. On this point, there are two things to be said. The first is that gas companies have never sought for a monopoly in the sale of appliances, and that, so far from harassing any trader, they would sooner encourage him by every means in their power. The second is that the sense of the Acts of Parliament from the very first, is that the gas companies have full powers to deal in all kinds of appliances for the use of gas, either by sale, hire-purchase, or hire; and the idea that any individual or body of traders has any right or interest, direct or indirect, in regard to the control of the trade in such appliances, is a pure fiction having no foundation in fact. The trade have pegged out a fairly wide domain as their own exclusive property; but they cannot show any title deeds for it. Gas companies have not been eager to enter upon those domains, and especially have they avoided rushing in upon established connections. The profits derivable have never proved strong enough to excite their cupidity; and while from the first they have taken full powers to sell, hire, or deal in all kinds of gas appliances, as a rule they have found sufficient occupation in providing for, and meeting, the needs of a continually increasing business. In most of our small country towns, and in some of our large ones, the demands for increased capital for extending the business have proved a continual worry and source of dispute to the directorate. Gasholders, retorts, mains, and meters have swallowed up capital as fast as the directors cared to provide it; and a manager with American notions of extending business is looked upon as a reckless devourer of capital, and strictly limited in respect to appliances. For these and similar reasons, there are very few districts where the trade has not had an opportunity of cultivating and appropriating the whole of the business incidental to the supply and fixing of gas appliances; and if they have not done so, it is their own fault.

The reasons that have directed the attention of gas companies to the appliances on the other side of the meter are far apart from questions of sale or supply. In course of time, it has become apparent that the average user of gas not only objects to the first cost and outlay involved in laying on gas to premises in regard to which in nine cases out of ten he has only an occupier's interest, but also he dislikes the trouble and responsibility of keeping appliances in good order and repair. He is glad to pay a moderate, but not highly profitable, rental to anyone who will take this matter off of his hands. Soon after the introduction of the meter, it became evident that, although as a matter of law the consumer is responsible for providing a meter and for keeping it in repair, the gas company must as a matter of fact be prepared to accept the whole of the responsibility, in return for a moderate consideration in the shape of a quarterly rental. Later on, difficulties of a similar character became apparent in the case of gas cooking-stoves. Some consumers could not afford to buy them, and others hesitated about sinking some pounds sterling in an appliance that might prove extravagant as regards cost of use, unsuited to their requirements, or in other ways not a success, and that might, under certain eventualities—such as a change of residence to a locality where gas was not available—prove to be altogether useless. Then it was found that, although the trade did not object to sell, they were dilatory in the matter of those little repairs that come under the head of maintenance. There is not only the advantage that the gas company supply the stove free of first cost, but also that they explain, or remedy, any little defects in working, and keep the thing in going order. This applies not only to the meter and the cooker, but to all kinds of gas appliances, and especially to incandescent burners, which are, from their nature, more in need of constant supervision than any other appliance.

Considerations of this nature have been repeatedly evident to gas companies. They see that trade in consumption of gas is being lost, when a little trouble would save it; and no one can fairly blame them for arranging to meet the demand. They have not looked for business of the character contemplated by the trade—a business that consists mainly of selling the goods and pocketing the discount; and the trade are particularly unfortunate in referring to the gas-cooker as an example of the evil times that may be expected to overtake any makers who commit their interests largely to gas companies. Compare the state of the gas-stove trade to-day with its position thirty years ago. Where one firm made gas-cookers then, a dozen make them now. One firm alone, last summer, was turning out over 1000 gas-cookers a week. The general result, as regards the manufacturers, was an unprecedented impetus to business. Or take any town of (say) 50,000 inhabitants, and compare the state of the gas-stove trade, before the gas company turned their attention to it, with that obtaining after the establishment of show-rooms and the regular system of hire and maintenance. In the first case we find one stove in use to every 25 or 30 customers, and a sale of one stove per 150 or so per annum—a trade so small as to be of no importance and not worth fighting for. In the second, we find a thriving business being done, until the saturation point is reached at something more than one stove to every two customers.

The assertion that the gas companies would not look at the Welsbach burner in 1893 and 1894, rather conveys the impression that special advances were made to them about that time; and in this connection, one might ask what inducements have been offered to them, either at that period or at any other. I am open to correction if wrong, but I believe that about this period the Welsbach Company were endeavouring to work one exclusive agency in each town or district—a system that was as objectionable to the trade as it was to the gas companies—and that only the one agent was entitled to full discounts. At a later period, persons or companies acting as agents were tied down by very stringent agreements. Many gas managers saw that there was something to be done with the appliance, and were prepared to work it on the lines suggested by their own experience and knowledge of the peculiar characteristics in their own district, but were absolutely unable to do anything under the conditions imposed upon them. To give one example, books were sent out in which all purchases and sales were to be entered; the books being considered the property of the Welsbach Company, and to be produced when called for. If a few other firms adopted similar regulations, there would be a serious addition to the clerical labour at the gas office. The natural opposition to methods of the kind just indicated appears to have been mistaken by the Welsbach Directors for a desire to do business on their own terms, or as hostility to the appliance as an economizer of gas. With the exception of small itinerant vendors of so-called pressure regulators, no one who had appliances of a gas economizing character to sell has had occasion to complain of a cool reception at the gas office. It is the exception, not the rule, for wholesale goods to be supplied under restrictions as to retailing. The trader lays in his stock and considers it his own property, and that he has the right to dispose of it as he thinks fit.

Opinions differ as to the causes which mainly contributed to the degree of success already achieved, and the possibilities of the future. But the view held by the writer—who can claim to be something more than a mere theorist, having some 600 public and over 2000 private Welsbach burners, covering all classes of lighting, under his control on maintenance terms—is that the large increase following the reduction of price in June, 1900, was chiefly due to the stimulus thus afforded to public lighting, and to maintenance. As regards the future, if the wise and far-seeing suggestions of the Advisory Committee are carried out in practice, the history of the gas-cooker will be repeated with the incandescent burner, and the present sales will be a small fraction only of the output attained when every gas company has adopted an efficient maintenance scheme. The gas-cooker moved but slowly until the gas companies undertook to keep it in going order; and the same applies with greater force to the Welsbach burner. Go into any important street, and it is easy to see whether maintenance has been taken up in the district or not. Some consumers make a hobby of maintaining the lights themselves; and when once they have experienced the excellent results that can be obtained with very little trouble, they find a pleasure and a pride in the work. But the majority have not the time, or have not the inclination; and the dirty glass or ragged mantle is a sorry advertisement for the system.

One point upon which gas engineers have given offence is that of the actual working cost of the mantle; and they must evidently keep at a respectful distance from this, for any meddlesome inquiries will call forth a well-deserved rebuke. But it is not taking too great a liberty to point out that there is much in the suggestion that gas companies should make their own mantles. The heavy loading necessitated by the enormous capital of the Welsbach Company is not the only item that goes to swell the cost of the mantle as at present supplied. There is the stiffening, the packing, the storing, and the carriage. One can conceive that it would cost far less to send 1000 mantle cottons and a bottle of solution—let us say to Land's End, where the process of manufacture could be completed on the spot, and the finished articles conveyed in specially designed cases or frames direct from the operating room to the consumer—than to prepare the 1000 mantles in highly rented buildings in London, treat them with stiffening solution, pack them singly in cardboard cases, and then to have considerably more to pay for carriage, &c. The cost of the London warehouse and factory, of the collection, and of the cardboard case could all be avoided; and it must be a considerable item. It is said that on the Continent this plan is adopted; and the Welsbach Company will do well to remember that in the course of a few years, it will be possible for anyone to sell mantle cottons and impregnating solution. Upon the question of manufacture and distribution costs, and the methods on which they are dealt with, depends an important aspect of the future of the Welsbach Company,

TECHNICAL RECORD.

INSTITUTION OF GAS ENGINEERS.

The Annual General Meeting of the Institution was commenced last Saturday at the Offices, No. 11, Victoria Street, S.W.—the PRESIDENT (Mr. W. R. Herring, of Edinburgh) in the chair. As usual at the February meeting, only formal business was transacted.

The SECRETARY (Mr. Thomas Cole) having read the minutes of the meetings held last year, they were confirmed.

NEW OFFICERS AND MEMBERS AND ASSOCIATES.

The SCRUTINEER (Mr. T. A. Guyatt, of Ely) having examined the ballot-lists for the election of officers and members, reported that the following gentlemen had been elected to take office:—

President—Mr. Thomas Holgate, of Halifax.
Vice President—Mr. Harry E. Jones, of Stepney.
*New Members of Council**—Mr. Augustus F. Browne, of Vauxhall; Mr. James L. Chapman, of Harrow; Mr. Harold G. Colman, of Birmingham.
Honorary Secretary—Mr. James W. Helps, of Croydon.
Auditors—Mr. Magnus Ohren and Mr. Alfred Lass.

* The other Members of Council are: Mr. A. E. Broadberry, of Tottenham; Mr. W. D. Gibb, of Newcastle-on-Tyne; Mr. S. Glover, of St. Helens; Mr. C. Meiklejohn, of Rugby; Mr. H. Morley, of Cardiff; and Mr. C. Wood, of Bradford.

The following names were added to the Institution roll:—

Members—Mr. A. J. Hope, of Nelson; Mr. H. V. Pearson, of Shoreditch; and Mr. Sidney O. Stephenson, of Tipton.
Associates—Mr. Francis Broadberry, of Tottenham; Mr. Norman S. Cox, of Sunderland; Mr. Walter H. Price, of Reigate; Mr. Lawrie Trewby, of Leicester; Mr. Frank Winter, of Hastings; and Mr. John C. Wright, of West Ham.

On the motion of the PRESIDENT, seconded by Mr. GEORGE WINSTANLEY (Coventry), the report was adopted.

The PRESIDENT then declared the proceedings adjourned to April 30, at the Institution of Civil Engineers.

DEVELOPMENTS IN THE GAS-ENGINE.

The Graduates of the Institution of Mechanical Engineers assembled in large numbers on Monday last week to hear a lecture by Professor T. HUDSON BEARE, F.R.S.E., on the above subject. Dr. A. W. B. KENNEDY, F.R.S., presided.

It is unnecessary to deal at great length with the lecture in these columns, as really the tale of gas-engine development told by Professor Beare was merely the reflection of the record of progress set forth from time to time in past volumes of the "JOURNAL." He took as his starting-point the trials made by a Committee of the Society of Arts in 1888. The engines used in those tests—the Atkinson, the Griffin, and the Crossley—represented the high-water mark of efficiency of those days. The Crossley engine was of the type that had then come into use, in which the old slide-valve had been displaced by lift-valves, and the old slide-valve flame method of ignition had been changed by hot-tube ignition. The trials were remarkable for the extreme care bestowed upon them; and the results obtained by Professor Kennedy and his colleagues were no doubt in full agreement with actual facts. In a test of an earlier gas-engine, Dr. Kennedy was able to express the opinion that combustion was not complete when exhaust took place; and through improvements effected upon his suggestion, better results were secured. The lecturer quoted the results of the Society of Arts trials, which were published in the "JOURNAL" for March 12, 1889. Up to that period, he pointed out, the ultimate size of any gas-engine put upon the market was 40-horse power. To the patent rights then existing in connection with the Otto engine, he attributed to a certain extent the maintenance of a high price, and the consequent hindrance to a more general adoption. So far as merit and quality in gas-engines were concerned, no doubt these patents were an advantage; because most of the rival makers tried to adopt some other cycle than the Beau de Rochas. In the lecturer's mind, there was little doubt the research which took place in those days did much to bring about the results achieved during the last fifteen years. He did not consider the old Otto engine cycle an ideal one for doing what a gas-engine was desired to do.

Since the expiration of the Otto patent, there has been a great deal of development; and first in order the lecturer referred to the introduction of the scavenging principle, upon the importance of which he placed particular emphasis. By it, he said, all the hot products of combustion were swept out; and in all engines in which it had been adopted, it had secured the possibility of much higher compression of the charge before explosion, without any risk of premature ignition. In addition, the scavenging charge rendered aid in cooling the cylinder sides. Marked economy was brought about by these changes; and five or six years after the Society of Arts trials, an improvement was found in the brake-horse power of nearly 25 per cent. The lecturer was enabled, by photographs of an Atkinson, a Griffin, and various Crossley-Otto engines, to deal with these improvements at some length.

About the period to which the lecturer had been referring, there was, he observed, an obstacle to any marked advance in gas-engines. It was that users had to employ ordinary lighting gas; and therefore they could not hope to compete with steam-engines. But owing to the successful methods of Dowson, Mond, and others, the problem had been to a large extent solved; and as a necessary corollary to the gas-producer, they had the larger engines. A general description of three types of gas-producer was given. With the introduction of the scavenging principle, it was remarked, a great step forward was made in the compression; and this made possible the use of producer gas. The latest development of this phase of gas-engine work was the Mond gas-producer, from which much was expected in the future. Experimental work had been carried on since 1879; and the results which had been achieved were exceedingly good. The lecturer described the plant, and drew upon Mr. H. A. Humphrey's recent paper before the Institution of Mechanical Engineers for points and facts. The beauty of the process, he thought, lay in the application of the regenerative principle from beginning to end. But in connection with the paper, and the use of a large volume of steam in the process, he pointed out that at Winnington, where the trials dealt with by Mr. Humphrey were made, exhaust steam was used; and it must not be overlooked that, under ordinary circumstances, steam cost something. Therefore, one would have to take the percentage efficiency of the plant with a little precaution. He entered a protest against the mixing up of producer costs and the results obtained by the use of producer gas, or the heat balance of the producer and the heat balance of the gas-engine. So far as the gas-engine was concerned, they got so many cubic feet of gas consumed in the engine for every horse power generated; and all they required to know about that was the heating value of the gas—it did not matter how it had been produced in regard to finding the heat efficiency of the engine.

Professor Beare then proceeded to show the great value of gas-producers, as disclosed by results obtained during recent tests on large gas-engines. He cited figures (already given in English publications) obtained first with a Körting 350-horse power two-cycle engine, in which a very perfect scavenging stroke was obtained, and in which electrical ignition was used. He then quoted the results of the trials given by Mr. Humphrey in his paper, with Mond gas, on a 400-horse power Crossley and a 500-horse power "Premier" engine. The results were interesting, because the two engines were of first-class design and workmanship, and large engines in continual work. The gain by high compression was distinctly shown. The Crossley engine had a comparatively low compression. It was kept under 100 lbs. to the square inch, while the "Premier" gas-engine reached 150 lbs. to the square inch; and there was a distinctly better result from the latter.

Following up the sequence of events, the lecturer referred to the year 1894, when attention began to be drawn to the possibility of using waste blast-furnace gases in the working of gas-engines—the idea being taken up at the same time in England, Belgium, and Germany. The lecturer followed very closely on the lines of the paper read by Mr. Bryan Donkin before the Institution of Civil Engineers in December last, an abstract of which was given in the "JOURNAL" for the 24th of that month. The development in England of the use of blast-furnace gas had, said Professor Beare, been very slow; but their neighbours and rivals across the North Sea had been more enterprising in taking up this question. He referred to the location of various engines of from 400 to 600 horse power which were being driven with blast-furnace gas, and then introduced some remarks as to the Oechelhaeuser engines of large powers. A few words were interpolated by the lecturer as to the usefulness of a Junkers calorimeter for determining the calorific value of gas; one which he had in his laboratory at University College, Edinburgh, having been found a very reliable instrument. A difficulty experienced in the use of blast-furnace gases in engines had been the large amount of dust carried over, and the great variation in composition. But this variation had, to a large extent, been overcome by the mixing of the gases from a number of furnaces. He illustrated this variation in the dust content of the gases by referring to one case in which the Société Cockerill had a 200-horse power gas-engine, the cylinder of which did not require cleansing for a great length of time, although the gas was not purified. A 600-horse power engine had also run for a considerable period without purification of the gas. On the other hand, at another place where the Cockerill Company had put up a large engine of the same type, they had quite a different experience. There the blast-furnace gas contained 4 to 5 grammes of dust per cubic metre; but at the other place the proportion of dust was not more than $\frac{1}{4}$ to $\frac{1}{2}$ gramme per cubic metre. A reference to apparatus which had been devised for cleansing blast-furnace gases followed. Then some information was offered regarding a Westinghouse engine of 650-horse power designed for use with this type of gas; and the lecturer further mentioned that one was being constructed of 1500-horse power. A 400-horse power Stockport engine used with Dowson gas also received passing notice.

The question was next considered as to whether large gas-engines were going to give great trouble in working; and, in this connection, Professor Beare said it was interesting to know, on Mr. Humphrey's authority, that a large Crossley engine—460 nominal horse power, but considerably over 100-horse power—at Winnington had run 96 per cent. of the hours in two years without any trouble at all. Of course, this engine was not the size of those he had been mentioning—400, 500, and 1000 horse power; but he took it that, when so much success could be reached in an

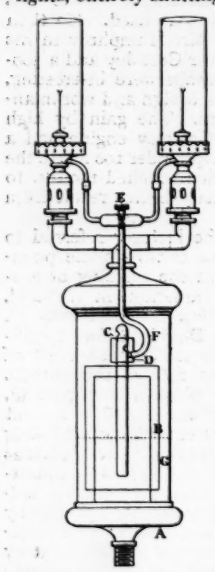
engine of over 100-horse power, the problem of making a gas-engine which would run without trouble had been solved, and, by good design of the working parts and careful jacketing, without having the difficulties they had heard of in regard to high temperature. The thicker and thicker the walls were made, the more liable, of course, was the interior to get heated, and the more likelihood was there of pre-ignition troubles; but that these difficulties had been largely overcome was shown by the running of the engines at Winnington. Though it was not safe to prophecy, it was pretty safe to forecast future lines of development in engineering practice by carefully watching present trend; and he did not think he should be far wrong in his forecast when he said that the utilization of blast-furnace gas would have a remarkable future in this country.

Dr. Kennedy, in moving a vote of thanks to the lecturer, referred to the time when he had a great deal to do with gas-engine tests. At that period, they thought that 16 or 20 horse power engines were of considerable size. Gas-engine manufacturers then could not be induced to make engines of 400-horse power; but now that producer, Mond, and blast-furnace gas had come, gas-engines of considerable size had rapidly followed.

The motion was heartily agreed to; and appropriate acknowledgment was made by the lecturer.

AUTOMATIC REGULATOR FOR INCANDESCENT BURNERS.

The accompanying sketch shows a contrivance for the automatic regulation of incandescent burners, which has been designed by Mr. W. Hall, of Manchester. The apparatus enables the gas supply to any number of burners to be lowered on to the pilot-lights, entirely shutting off the main supply to the burners, or the main supply to be turned on, and the pilot-lights shut off, at will. It has been tested on the platforms of one of the Manchester railway stations, at various distances from the bye-pass taps with, we are informed, very satisfactory results. It is exceedingly simple in construction, and can be worked at a pressure of 1 inch, or anything above this. There are no leathers or valves to get out of order; the seal can be made with either oil, water, or mercury; and the whole arrangement can be produced at a very small cost for any number of burners. A lantern fitted with this appliance may be made practically dust-tight; and chains dangling from the lamp-cocks are entirely dispensed with, as no separate taps on the lamps are required. The regulator consists of a piece of 1½-inch brass tube about 4 inches long screwed at both ends, and fitted with brass caps. The lower cap A is fitted with a ⅜-inch brass nipple to screw on the lamp-burner pipe. A piece of 1-inch brass tube is screwed into the opposite side. This conveys the gas inside the brass float B, which has fitted to its centre a piece of ⅛-inch brass tube about ¾ inch longer than the float. In this tube are two small holes C and D, one on either side. Before the gas is turned on, the hole D is directly opposite the outlet-pipe F, which conveys the gas to the pilot-lights only. The pressure on the main supply at this stage will be 3-10ths; but the moment the main bye-pass is turned on at a pressure of 10-10ths, the float B rises, shutting off the pilot-lights, and allowing the main supply to pass through the hole D into the burners, which immediately ignite. If the main bye-pass tap is closed, the float settles down again to its former position, allowing gas to pass to the pilot-lights only. E is a small brass set-screw for regulating the supply to the pilot-lights; while G shows the oil-seal.



CARBURETTED WATER GAS IN EUROPE.

A recent issue of the "American Gaslight Journal" contained an article on the above subject, specially prepared for that publication, by Mr. J. T. Westcott, of the Economical Gas Apparatus Construction Company, Limited.

The author opened his subject with the declaration that carburetted water gas, assisted by the Welsbach mantle, is the greatest heritage the gas industry has at the present time. The first carburetted water-gas plant was erected at Phœnixville (Pa.) in 1873; and the development has been so rapid that there are now sufficient plants in operation in America to supply all the illuminating gas made and sold during the year. Beginning with Professor Lowe, the inventor of the modern process of water-gas manufacture, the author, in a short historical retrospect, traced the progress of the business in America and its extension to Europe. At the outset, a number of independent operators were at work on the other side of the Atlantic; and to them and the able Engineers of the United Gas Improvement Company, of Philadelphia, the development above alluded to was in a large measure due. In 1889, however, these independent workers were driven from the field, when the Courts decided that the original patents of Professor Lowe were valid. This gave the United Gas Improvement Company sole charge of this class of the business until the expiration of the patents in 1892. At this time, several Companies came into the field, among them Humphreys and Glasgow, the Western Gas Construction Company, and the Economical Gas Apparatus Construction Company, operating the Merrifield-Westcott-Pearson patents; the two former Companies building practically the same type of plants as the Gas Improvement Company.

In 1890, the United Gas Improvement Company came to England and entered into a contract with the Gaslight and Coke Company to put in plant of a daily capacity of 2 million cubic feet. This was the first commercially successful plant erected in Europe. In 1894, the Economical Gas Apparatus Construction Company, Limited, of Toronto, opened an office in London, with Mr. J. T. Westcott as Manager; and about the same time, Messrs. S. Cutler and Sons, opened a department for the supply and erection of carburetted water-gas plants. These three firms, with their agencies and connections throughout the world, have since been doing everything in their power to introduce these plants, with the result that at present the carburetted water-gas plants in Europe have a total daily capacity of at least 152,770,000 cubic feet, subdivided as follows: England, 123,945,000 cubic feet; Scotland, 2,000,000 cubic feet; Ireland, 8,200,000 cubic feet; the Continent, 18,625,000 cubic feet. Plants are located in Denmark, Holland, Belgium, Germany, Switzerland, and Sweden.

When Mr. Westcott once asked Professor Unwin if his Technical College was the same as the Stevens Institute of Technology at Hoboken, New Jersey, he replied that they were the same, with the exception of the difference which exists between things English and things American. So, said the author, the development of carburetted water gas in Europe has been similar to its development in America, except the different conditions existing between everything in the two countries, one of which, for the subject in hand, is the different climatic conditions. In Europe, gas-house coke is used instead of anthracite coal as fuel in the generators, as there are no deposits of anthracite in Europe similar to those of Pennsylvania. The oil of the major portion of Europe has to be brought from a distance, whereas it is found on the spot in America. The oils used have varied greatly, from the heavy oil of Russia to the light oils of America, with the shale oil of Scotland and Germany, and a sprinkling of Borneo oil. To meet these various conditions, the apparatus has been altered in detail from that used in America.

The question of the supply of gas oil was a serious one at first, as the different oil companies were not in a position to deliver it at a cheap price, especially inland, although oil could be procured at seaport towns very reasonably in bulk. As the demand for it has become greater, the methods of supply have also increased, until now the different oil companies are in a position to deliver at a reasonable price at any place in the United Kingdom, and at most places on the Continent.

The much more rapid development of carburetted water gas in Great Britain compared with Continental countries is due principally to the fact that, as England is a Free Trade country, there is no duty on oil, whereas in many of the Continental countries—France, Spain, &c., there are two duties—the general Government duty, and the civic or city duty, which is very high, and practically prohibits the use of oil for gas-making purposes. In Belgium and Denmark, the duty does not to any great extent interfere with the supply of gas oil; therefore there are proportionately more plants. This is also true of Holland. In Germany they have a little native oil, and their free ports admit oil free of duty. Beyond this, the taxes are a serious handicap to the introduction of carburetted water-gas plants.

Referring to the appointment of the Departmental Committee, and to their recommendation that power should be conferred upon a central department to make regulations limiting the proportion of carbonic oxide in the public gas supply to 12 per cent., or such greater amount as they might consider desirable, Mr. Westcott remarked that, though Parliament has not as yet passed any Act regulating the amount of carbonic oxide to be distributed to the consumer, it is a generally understood thing—one might say an unwritten law—among the gas engineers of England that they shall not send out more than about 25 per cent. of carburetted water gas mixed with their coal gas. In many gas-works, the managers use the carburetted water-gas plants only to carry them over the heavy days of the winter, shutting them down entirely during the summer months. Others use them continuously throughout the year; while others, again, only run them intermittently during the daytime. They have been found of great convenience to many in times of sudden fogs and cold spells.

In conclusion, the author pointed out that the local conditions of the country, its people, its resources, and its laws, have had much to do with the development of its industries; and this applies in a very marked degree to the progress of carburetted water-gas plants. But he said we must not forget the assistance they have been in competing with the electric light, and the advantage they have been to modern enterprise, as a most valuable attribute in the formation of gas and oil trusts.

REGISTER OF PATENTS.

Gas Cooking-Ovens.—Hygienic Stove Company, Limited, and Greenwood, E. P., of Huddersfield. No. 1519; Jan. 23, 1901.

The patentees claim a method of automatically lowering the gas-jets in a stove on the opening of the oven-door, and raising them on the closing of the door, by means of a quadrant lever (controlling a valve which restricts the supply of gas) actuated in the one direction by the door itself, or a projection thereon, and in the other direction by a spiral spring. Means are also provided for regulating the extent to which the gas supply can be restricted; the method of circulating the waste gases in the space between the upper and lower ovens; and the means for automatically regulating the outlet of waste gases, by a link or lever connecting the damper with the valve which controls the supply of gas to the bottom burners.

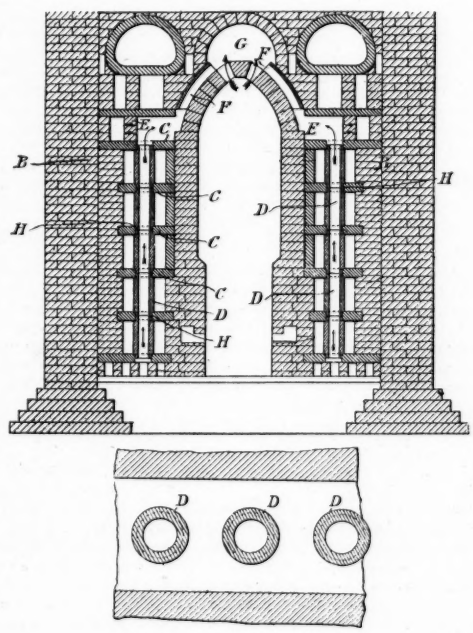
Brackets and Fittings for Gas-Lamps.—Mucke, F., and the Deutsche Continental Gas Gesellschaft, of Dessau, Germany. No. 2040; Jan. 29, 1901.

This invention has for its object "to provide, in the form of a bracket, a support which will leave the lamp suspended freely and admit of its movement in a horizontal direction upon the bracket, while the bracket itself is capable of free movement upon a pivot or centre, and the lamp-supporting stem or member is also free to be raised or lowered while supported upon the travelling carriage which moves on the horizontal arm or bracket." Another part of the invention has reference to means for raising and lowering the lamp so as to secure it in any position, while leaving it free to be moved backwards and forwards upon the horizontal arm. The joint and plug for use in connection with this fitting is made so as to facilitate the ready attaching of a connection to any supply main or branch. [The arrangement is sufficiently described and illustrated in the "JOURNAL" for Sept. 3 last, p. 570.]

Generator or Regenerative Furnaces.—Brearley, J H., of Longwood. No. 3266; Feb. 15, 1901.

This invention relates to an arrangement of air-passages in conjunction with the passages for conveying the waste effluent gases from a retort-furnace to the flue or up-take, "whereby the primary and secondary air supplies, in their passage to the combustion chamber, will be rapidly heated to a high temperature by absorption of the heat of the waste effluent gases; the whole of the waste heat thus being utilized in the heating of the air supplies."

The flues A for the waste effluent gases are arranged horizontally, extending from front to back of the setting as ordinarily; and the waste gases from the furnace are caused to travel from back to front and front to back alternately, zizgag, through the series in order to reach the exit-flue or up-take at the bottom of the furnace. These passages may be formed by tiles, slabs, or bricks C, or may be solid drawn or pressed in suitable forms and sections to meet requirements.



Extending centrally through any desired number of the waste-gas passages are a number of vertical tubes or passages D, set at suitable distances apart one behind the other from front to back of the recuperator, and each communicating at its lower end with an air-inlet at the front of the furnace; there being one separate air-inlet to each tube D, or one inlet serving for two or more tubes, as may be preferred. The upper ends of these secondary-air tubes on each side of the furnace are open to respective chambers E, having outlets F (controlled by any ordinary form of dampers), by which the admission of heated atmospheric air to the combustion chamber G can be regulated.

The secondary-air tubes are preferably of round section (as shown), and made in short lengths with reduced or recessed ends to fit into sockets or into openings H in the top and bottom dividing walls or slabs C between each waste-gas flue or passage, so that good joints are made and bye-passing or short circuiting prevented.

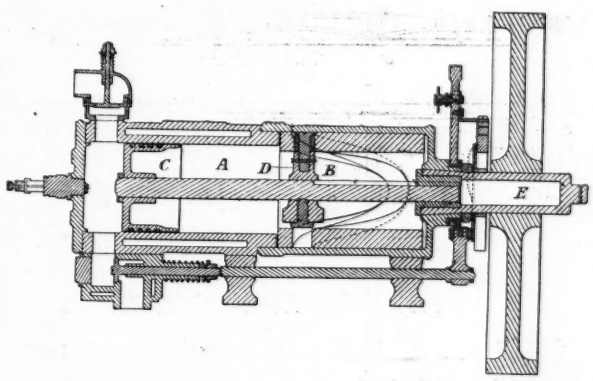
Rotary Engines, Pumps, Exhausters, Blowers, &c.—Goodwin A., and Hargreaves, W. L., of Sumner Street, Southwark, S.E. No. 3610; Feb 19, 1901.

This apparatus comprises a disc having three radial slots spaced at an angle of 120° apart, and each fitted with a plate-like piston, and a casing wherein the disc is centrally mounted so as to form therewith a fluid-tight joint at two diametrically opposite parts or bearing surfaces. The interior of the casing between the opposite parts or bearing surfaces is enlarged so as to form two oppositely arranged working spaces or chambers. The inner periphery of the outer wall of each chamber is of circular arc shape in section, and eccentric to the disc, so as to form therewith crescent-shaped working spaces or chambers, through which the piston and the fluid acting upon them, or being acted upon by them, travel. Each is provided at or near its opposite ends and in proximity to the two bearing surfaces, with inlet and outlet ports for the motive fluid, controlled so as to be opened and closed at the required times in order to effect the supply and exhaust in any desired manner.

Gas-Engines.—Smith, F. H., of Herne Hill, S.E. No. 4712; March 5, 1901.

The object of this invention is to lessen vibration and shocks by dispensing with the crank and connecting-rod of the engine, and more perfectly balancing the parts.

The piston-rod (as shown) has fixed to it an arm or lug D carrying a roller which works in a cam formed in a prolongation B of the cylinder A; the shape of the cam being such that the piston rod and piston C



are caused to continuously revolve in the cylinder as they reciprocate. The main shaft is in a line with the piston-rod, and is so connected to it that they turn together, but leave the piston-rod free to reciprocate. The fly-wheel has a hollow boss E in which the piston-rod can work to and fro; but the two revolve together by reason of the groove and feather shown.

Incandescent Gas-Burners.—Blakey, J. W., of Bradford. No. 5022 March 9, 1901.

The object of this invention is "the construction and supporting of incandescent gas-burners so that a brilliant light is produced, and the liability of damage to the mantle minimized." It consists in constructing the burner with a double cone—that is, a portion of the gas and air mixing chamber is a conical tube, the upper part of which is at a different angle to the bottom portion, which terminates with a wider base. The continuation rod for supporting the mantle is attached to the upper portion of the conical tube; and communicating with the interior of this portion of the conical tube is a circular box provided

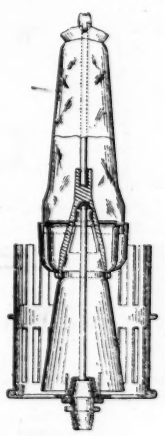


Fig.1.

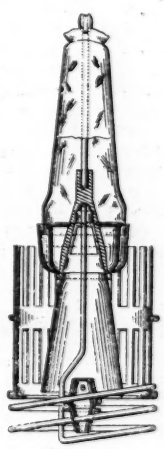


Fig.2.

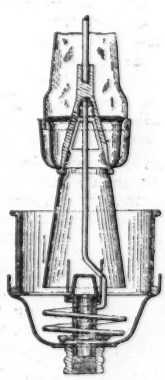


Fig.3.

with a gauze or perforated cover—the conical tube and box constituting the gas and air mixing chamber. The gas flows into the wide base of the conical tube; and the tube, together with the mantle, gallery, and other appendages, is supported by a vertical rod fixed in the centre of a boss through which the gas is supplied to the burner. The rod terminates at the top of the conical tube in a point, to allow the whole of the parts supported thereby to rock freely. Instead of the vertical rod commencing as a fixture in the centre of the gas-supply boss, it may be extended towards the base of the burner and formed into a

coiled spring; so that, in addition to allowing the conical tube to rock freely on the end of the support, the latter is also resilient.

Fig. 1 represents a vertical elevation of the burner and gallery secured to the boss of the gas-supply pipe. Fig. 2 shows the vertical rod commencing at its base as a spring for giving resilient support to the burner and mantle. Fig. 3 shows the vertical rod commencing at its base as a spring secured for giving resilient support in a modified manner.

Purifier Covers.—Cripps, F. S., of King William Street, E.C. No. 5730; March 19, 1901.

This invention consists of a purifier top composed of surfaces arched upwards so as to reduce the strains on the curb and top sheeting caused by the internal lifting pressure of the gas; the object being to reduce the weight of the cover without reducing its strength.

Fig. 1 is a sectional elevation of a cover composed of three arched surfaces. Fig. 2 is a plan of same. Fig. 3 is a cross section, showing the outside girders and the inside struts. Fig. 4 is an enlarged section of the curb, showing the holding-down bolts. Fig. 5 is a section through the outside girder, showing the holding-down bolts. The arches A are of sheet iron or steel, consisting of two or more short spans, and are supported on the two sides of the cover from which they spring by the curb C; and where the adjacent arches meet or intersect they are supported by girders G, crossing the cover on the outside. Each end of these girders, as well as the arches A, may be attached to a gusset end-plate E, which distributes the lifting force due to the gas pressure

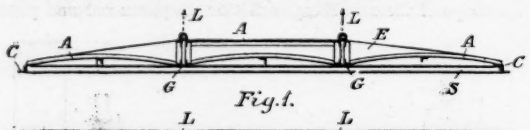


Fig. 1.

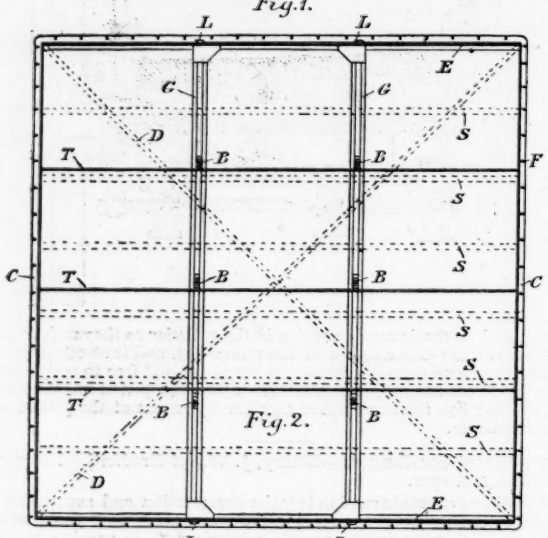


Fig. 2.

Fig. 3.

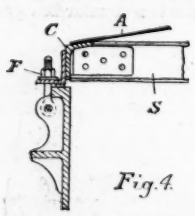


Fig. 4.

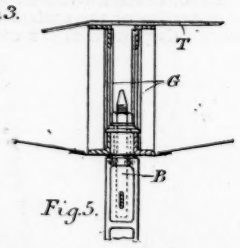


Fig. 5.

when the cover is in position and the purifiers at work, and stiffens the cover when lifting from the ends—particularly in the case of covers designed for purifiers without water-lutes. The pull of the outer arcs or arches of the top sheeting on the curb on the two sides of the cover is relieved by a series of internal horizontal struts S, passing across the full width of the cover, and attached to the curb C at each end, as well as to the outside girders where they cross them. When lifted at the two ends (at points L), the girders prevent the cover sagging in one direction; while the struts S—acting as a series of short cantilevers—prevent the curb sagging in the other direction. The struts may be further assisted in preventing the sag or deflection of the curb C on one side to the top flanges of the girders G, across the cover, and down to the curb C on the opposite side. To assist in keeping the cover in shape horizontally, diagonal ties D may be fixed from corner to corner inside the cover.

Manufacture of Gas.—Schniewind, F. W. C., of New York. No. 17,494; Aug. 31, 1901.

This invention has for its object the production "of illuminating gas of high candle power, and of general good quality at low cost.

In patent No. 10,588 of 1900, the patentee described a method of manufacturing gas in which carbonaceous material is treated in externally heated retorts; and the gases of dry distillations thus produced are separated into two portions—one, preferably that poorer in illuminants, being treated for the extraction of its illuminants, which are then mixed with the untreated portion in order to increase its illuminating value. As most usefully applied (the patentee now remarks), this process is used in connection with coke-ovens heated by a gas-furnace; the gas treated for extraction of these illuminants being used to heat the furnaces. In such modes of application, the theoretically possible efficiency of the process is necessarily modified by the requirements of the gas-furnaces—a certain percentage of the gas being imperatively required to maintain the distillation process. Under certain conditions, and in treating certain coals, there is, therefore, a surplus of illuminants over that necessary to raise the enriched portion of the gas to a standard of desirable illuminant value. Again, where the process is carried out with the "best efficiency"—the richer and poorer gases being separated, and the poorer gases only treated for the extraction of their illuminants—the rich portion of the gas may contain an undue percentage of sulphurous impurities, "because the sulphurous compounds which contaminate the gas are given off most freely during the earlier stages of distillation." This is detrimental, because it is necessary that sulphur compounds above certain small percentages should be removed from the gas, and the process of removal is expensive.

The particular objects of the present invention are said to be, in the first place, to provide for an additional supply of gas of low cost, and of proper character to be mixed with the enriched portion of the gas, so that the total volume of illuminating gas may be provided equivalent to the amount of illuminants available; in the second place to provide not only for the increase in volume of the illuminating gas, but for a diminution of the percentage of sulphurous impurities in the gas so as to diminish the cost of purification; and, in the third place, to provide a volume of cheap fuel gas for admixture with a portion of the gas produced by distillation which is available for heating the gas-furnaces—thus obviously increasing the portion of gas available for illuminating purposes.

To effect the above purposes, the patentee provides, in connection with an apparatus for manufacturing gas by dry distillation and for treating a portion of the gas to extract its illuminants, and mix them with the untreated portion, a water-gas generator in which ignited carbonaceous material can be treated alternately with blasts of air and steam, so as to produce alternate volumes of producer gas and water gas. The water gas produced is mixed with the enriched gas of distillation, and the producer gas with a portion of the distillation gases which have been robbed of their illuminants so as to increase the volume of the gas available for heating the retorts. The invention, (generally speaking) consists in treating carbonaceous material for the production of the gases of dry distillation; dividing the gases into two portions of unequal illuminating value; treating one portion—preferably the poorer one—for the extraction of its illuminants; and mixing the illuminants with the untreated portion of gas. Then another body of carbonaceous material is subjected to treatment in order to produce water gas; and this water gas is mixed with the enriched gas of distillation in order to increase the volume of such gases, and diminish their contained sulphurous impurities. The invention further consists in the utilization of the producer gas formed alternately with the water gas for admixture with the gas from which the illuminants have been extracted; and the use of such gas for heating the retorts in which the gas of dry distillation is produced.

Purifying Gases.—Abel, C. D.; a communication from J. Saltar, jun., of Philadelphia, U.S.A. No. 19,826; Oct. 4, 1901.

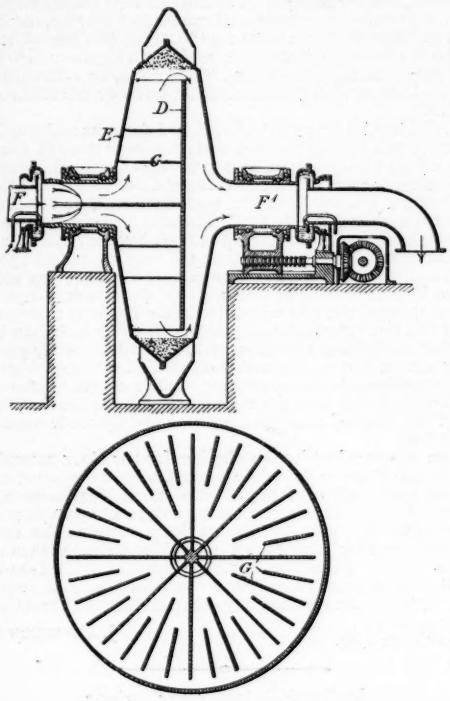
This invention relates to the purification of gases from solid, liquid, or semi-liquid impurities (such as tar) by centrifugal force alone; the method employed "differing from those heretofore used where centrifugal force was also applied, in that any disturbing subsidiary motion of the gases which would interfere with the separation of the particles of solid matter and with their deposit against the casing of the apparatus, is practically avoided." In other words, the method of operating is such that the gases, while passing through the centrifugal apparatus, travel mainly only in a radial direction, or at about right angles to the axis of rotation of the apparatus, and only to a small extent, and with as low a velocity as possible, in the direction of such axis.

The apparatus (shown) consists of a casing, which can be made to rotate by any suitable means. An essential part of the apparatus is the diaphragm or partition D, connected rigidly to the casing E by radial blades G, and having a diameter of such size as to leave only a comparatively small annular space between its periphery and that of the casing. The gases entering at F are put in rotation by the blades, and, while rotating, they are propelled first in a radial direction and then over the edge of the partition D, and, after travelling back to the centre of the casing behind the partition, finally flow off through the tubular axis F1. By means of the blades, the gases are made to move as nearly as possible at the same speed as the parts of the apparatus they come in contact with, in order that there may be little or no relative motion between them in the direction of rotation. Consequently, any disturbing eddies in the gases are avoided.

As the gases, during their passage through the drum, are only restricted in their flow at one part—namely, where they pass the periphery of the partition D, and where the sectional area is reduced relatively to the total sectional area of the drum—there will only be at this point a relative motion between the gases and the casing in an axial direction. But even this cannot act detrimentally, as the gases, when they arrive at this point, will practically already have parted with their content of solid particles, and because, owing to the large diameter of the centrifugal drum as compared with the diameter of the central discharge-passage, the sectional area at the peripheral opening can be made sufficiently large to reduce the velocity in the axial direction at that point to a small degree. Such solid particles as have not already been separated from the gases when they arrive at the periphery will have only to travel a very short distance through the gases under the action of the centrifugal force in order to escape from the stream of gas.

The solid particles are allowed to accumulate in the circular trough formed at the periphery of the drum, until a layer of a certain thickness

is attained, whereupon the two halves of the drum are slightly separated at the periphery, and consequently the accumulated particles are thrown out by centrifugal force through the narrow peripheral opening, together with a certain amount of gas. For effecting such periodical separation of the two parts of the drum, various arrangements may be employed. In that shown, the one bearing of the drum is mounted so as to be horizontally moveable on a base-plate; the motion being effected by means of a screw-spindle rotated by bevel-gearing driven by suitable power.



For enabling the right-hand half of the drum to be removed more or less from the left-hand half while continuing to rotate with it, and without requiring to stop the rotation of the drum for the purpose, various arrangements may be employed. According to one of these, one-half is provided on its periphery with a number of fixed pins projecting at right angles therefrom, and passing through corresponding holes on the periphery of the other half. For working in the ordinary manner, with the peripheries of the two halves in close contact, the driven half will carry the moveable half round with it by the pins; while for opening the periphery for the discharge of accumulated matter, the moveable half is slid backward to the required extent upon the pins, which still continue to carry it round with the driven half.

Securing Mantle-Supporting Rods in Incandescent Burners.—Bray, J. W., of Leeds. No. 22,104; Nov. 2, 1901.

The object of this invention is to construct the bottom of the mantle-rod so that a thread or strip of asbestos may be attached to it for the purpose of packing the portion of the rod inserted in the socket of the gas-burner in such a manner that the rod, when inserted, will be held firm and vertical, and support the mantle vertically.

APPLICATIONS FOR LETTERS PATENT.

2681.—Bray, G., "Street-lanterns." Feb. 3.
2706.—Graham, M., "Gas producers and furnaces." Feb 3.
2712.—Garner, E., "A spring-valve sealing-wax burner with bye-pass." Feb. 3.
2751.—Harris, L. G., "Manufacture of gas." Feb. 3.
2756.—Bergemann, H. C., "Gas-Engines." Feb. 3.
2796.—Gabrielsen, C. A., "Conveyors." Feb. 4.
2817.—Potter, W. G., "High-power gas-lamps and the like." Feb. 4.
2851.—Foster, G. V., and Mackusick, E. F., "Acetylene gas-generators." Feb. 4.
2870.—Johnson, T. A., "Gas-producers." Feb. 4.
2937.—Westley, J., "Reducing valve." Feb. 5.
2929.—Udal, W., "Acetylene gas-generator." Feb. 5.
2972.—Tangyes, Ltd., and Robson, J., "Internal combustion engines." Feb. 5.
3033.—Fletcher, J., "Reducing valves." Feb. 6.
3091.—Durrant, E. A., "Gas and oil engines." Feb. 7.
3099-3100.—Ormerod, J. A., "Reducing valves." Feb. 7.
3112.—Alston, C. H. T., "Internal combustion engines." Feb. 7.
3206.—Heys, W. H., "Gas-lighters." A communication from L. M. Thompson. Feb. 8.
3217.—Marshall, H., "Lighting by means of carburetted air." Feb. 8.
3233.—Seel, E., Reflector for incandescent gas lighting." Feb. 8.
3235.—Wills, W. R. & W. R., "Gas or other explosive engines." Feb. 8.
3242.—Bamford, F., "Internal combustion engines." Feb. 8.
3246.—Kruseman, J. A., "Acetylene lamps." Feb. 8.
3271.—Hennebohle, F., "Fluid pressure valves." Feb. 8.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by correspondents.*]

Gas Companies and the Factory and Workshop Act, 1901.

Sir,—The question having been raised by several Gas Companies, members of the Gas Companies' Protection Association, as to whether the above-named Act applies to gas undertakings, I was instructed by Mr. George Livesey, the Chairman of the Association, to take the opinion of Counsel thereon, which I have done. As the matter is one of importance to gas companies, I shall be obliged by your allowing me to state, through your columns, that Counsel advises that, while the matter is one not free from doubt, he is, on the whole, of opinion that the Act does apply to Gas Companies.

F. E. Cooper, Secretary.

5, *Victoria Street, S.W., Feb.* 14, 1902.

Income-Tax Assessment—Allowances for Wear and Tear.

Sir,—In October last, I addressed a letter to the "Journal" (p. 979), in the course of which I stated that my Company were making a claim for a yearly allowance in the assessment of profits for income-tax for depreciation of the bulkier portions of the plant—such as gasholders, purifiers, scrubbers, mains, &c.—the renewal of which takes place at long intervals of time, and the cost of which is so great as to preclude it being charged in the revenue account for the year. The local Surveyor of Taxes having disallowed the claim, we appealed to be heard by the Commissioners for Special Purposes; and this appeal came on a week ago, at Scarborough, before two Special Commissioners.

The net result was as follows: In the first place, the Commissioners stated that it was the rule of the Department to allow for the depreciation of the plant—whether it was small or large—when and as it was renewed. I then drew their attention to the wording of the Customs and Inland Revenue Act, 1878, section 12, which says the Commissioners shall, in assessing the profits or gains under Schedule D, allow such deduction as they may think just and reasonable as representing the diminished value, by reason of wear and tear *during the year*, of any machinery or plant used for the purposes of the concern, and urged that their rule was not in consonance with the law, as the phrasing evidently contemplated an annual allowance. This they seemed to admit, saying that if we wished for a yearly allowance we could have it so. A long questioning took place as to the life of the various portions of the plant, the age of those portions which had been replaced in the past, and the age and condition of the apparatus in use. Generally speaking, the life appeared to be longer than that given in Mr. Newbigging's "Valuation of Gas-Works." It can be understood that, in a slowly growing works, the plant runs the term of its natural life; while in a rapidly growing works, it meets with a premature death to make way for larger plant—which may in part account for the longer life in our case.

If we choose to have the yearly allowance, I was told it would have to apply to the whole of the plant, and not to part only; that nothing beyond the yearly allowance would be permitted to be debited to the revenue account; and that it would take the place of the items now appearing under the heads of "Manufacture" and "Distribution" for repairs and renewals in any shape or form. The Commissioners further stated that the yearly allowance would be small (in their own words, it would be "a nominal sum"); that what was "just and reasonable" was in their discretion; and they intimated that, as far as they knew, there was no appeal from their decision. After such a statement on their part, I did not deem it expedient, nor consider it would be advantageous to this Company, to pursue the claim for a yearly allowance on gasholders, purifiers, mains, &c., in addition to the amount already allowed in the revenue account. Our repairs and renewals under the heads of "Manufacture" and "Distribution" amount to 5d. per 1000 cubic feet of gas sold.

On my stating that I had it on good authority that some gas-works had a yearly allowance made to them for depreciation of gasholders, I was informed that this might have been done in ignorance by the local Commissioners, or even by the local Surveyor of Taxes; but if the matter came before them it would not be allowed.

With regard to the question whether, in case the cost of renewals in any one year should be of such an amount as to absorb more than all the "profit," and leave an adverse balance to carry to the next year—a contingency which might arise in the renewal of a gasholder—the balance would be allowed as a debit on the following year's working, the Commissioners, after consulting the Surveyor, came to the conclusion that it would.

Referring to the suggestion made by Mr. Livesey at the last meeting of the Gas Companies' Protection Association, that a suspense account should be opened if the expense of any renewal was too heavy for any one year to bear, so that it might be spread over two or three years, I cannot find that a statutory company has any more authority to make a suspense account than it has to form a depreciation fund pure and simple. It may perhaps be allowable to make slight infringements of the letter of the law, if the spirit of it is not departed from. A suspense account would seem to have the advantage of dealing with money actually expended, as against the speculative estimate of what will be required to be expended at some future time.

Henry Tobey.

Malton, Yorks., Feb. 15, 1902.

Welsbach Lighting.

Sir,—As might be expected, my remarks on the subject of the initial cost of an incandescent mantle have excited the righteous indignation of the manufacturers; and that my little "story," as the Berlin incandescent firm so courteously puts it, should have been given to the world, is naturally a sore point. First, let us clear the ground, and state that my figures refer to an impregnated uncalcined mantle, such as would be purchased by gas companies and wholesale dealers. No

one would, by choice, take a collodionized mantle if he could conveniently obtain a plain calcined one.

I may be a specialist, or I may not; and where I obtained my knowledge as to the cost of the mantles is neither here nor there. Suffice it to state, however, for the benefit of the Berlin Company, that the first mantles ever circulated on the Continent passed through my hands. Provided with the necessary solution, which is now easily obtainable, there is nothing very mysterious involved in turning out mantles; and when I had the pleasure of meeting the members of the Institution of Gas Engineers in Copenhagen not long ago, I offered to show some of them a mantle-impregnating installation, if they cared to see one.

But to the point. The Birmingham Incandescent Company (How do they flourish in face of the Welsbach fulminations?) admit Mr. George Livesey's soft impeachment, and place his estimate of 3d. as the *selling* price of the mantle as a "reasonable one;" and they furthermore admit the manufacturing cost of a good mantle to be 2¼d., leaving them ¾d. per mantle profit. The Berlin Incandescent Company scout the idea of the Welsbach Company being able to sell at 3d., and declare that a profit of only ¾d. per mantle would be to their complete undoing. And yet they have undone themselves with a profit of from 9d. to 1s. per mantle!

Let us assume that the Incandescent Company's is a "bull," and that mine is a "bear" quotation as to initial costs; and for the sake of peace, we split the difference between their admitted 2¾d. and my 1d. (about), when we arrive at a mean cost of 1·87d.

As I stated in a previous letter, we have for some time past been purchasing genuine Welsbach mantles for less than 6d.; and I can to-day buy good mantles from the small local Danish companies—such as "Dan," "Phœnix," "Helios," and many others—*for less than 3d.* Last year I used several thousand German mantles (excellent mantles, too), which cost us about 2¼d.; and we have recently received a German quotation for mantles at 15 pfennige, *at not quite 2d. per mantle.* So that I think my estimate of 1d. as the initial cost of a mantle to be not far from the mark.

Once gas consumers in England are rid of the Welsbach patents "Long ju-ju" bogey, they happily will be situated as we are, and will be in a position to purchase good mantles at 3d., leaving a nice profit to the manufacturers—notwithstanding the Berlin Incandescent Company to the contrary,

Copenhagen, Feb., 1902. F. D. MARSHALL.

The Trend of Gas Invention.

SIR,—Referring to the letter in the last "JOURNAL," under the above heading, from Mr. F. D. Marshall, of Copenhagen, and the postscript attached thereto, regarding the Slough inclined retorts, I may say that, before deciding upon sloping retorts, my Directors and myself made careful inquiries as to whether the system would pay if erected on a works making from 40 to 50 millions per annum; and we eventually decided that it would be an advantage.

You will readily understand that to "heat up" or "let down" a through bed of slopers 20 feet long would be a difficult matter in a works of such capacity, other than by "laying off" for long periods, and heating the retorts to no purpose.

It might be cheaper to fix 20 feet slopers. But we had to consider how small we could erect the slopers economically—bearing in mind the foregoing condition; and we came to the conclusion that 16 feet was a suitable length from this standpoint.

There is, however, a further advantage in fixing the retorts 16 feet long. During our many visits to the various installations of inclined retorts, we found that some of the North of England coals "creep" considerably in a retort 20 feet long; but if a stopper 3 or 4 feet long is fixed in the lower mouthpiece of a 20-feet retort, the same coal retained its position until carbonization was complete.

We often use similar coal; so, apart from considerations of cost, we think a 16 feet long retort adapted for our requirements, even so far as the coal supply is concerned.

In the editorial note to the letter, you remark: "It is a difficulty to understand why 15-feet retorts, &c., are being erected in a 20-feet house." The foregoing remarks to a certain extent reply to this query; but I have not heard that the width of retort-house had been definitely decided for sloping retorts. We visited many works; and I believe all varied in the distance from the settings to the side walls of the house, and as we were in many cases almost roasted on some of the stage-floors, we decided to err on the side of ventilation rather than the reverse.

I do not purpose commencing a correspondence upon this matter, which appears to be just now fashionable; but seeing the works I have charge of has been referred to in the "JOURNAL," I merely reply—showing that we have not decided upon the apparatus we are erecting at our new works without careful consideration.

Slough, Feb. 15, 1902. THOMAS WEBB, Manager.

Coke and Coal Handling Plant.

SIR,—If Mr. Archibald Little was in a position to criticize the De Brouwer conveyor with an unprejudiced mind, I would refute every single statement he has made regarding it on pages 342 and 343 of the last "JOURNAL." But I am too busy making the conveyor to spare time to correct the mis-statements of one who might assume that he is a trade rival.

Retford, Feb. 14, 1902. W. J. JENKINS.

SIR,—I notice in the article communicated by Mr. Archibald Little in the last number of the "JOURNAL," on the Zurich coke-handling plant, a sweeping condemnation of the De Brouwer conveyor, followed by a panegyric on the tray-plate conveyor; no mention being made of other types of hot-coke conveyors which have been installed. Mr. Little says: "It will be difficult to convince me of the utility of this contrivance." And he further states that the chains and cross-bars are too light, and are continually bending and pulling out; also that his experience is that the chains have to be repaired every day, and renewed every few months. "The coke is very much broken and worn, causing a large percentage of breeze, reducing the selling price, &c." This is strong adverse criticism; and it would be interesting to know where Mr. Little obtained his experience of the actual working of De Brouwer coke conveyors.

I can assure your readers that, so far as my experience goes with the actual working of a De Brouwer coke-handling plant (which has now been in daily use some four or five months at our Litchurch works), the many defects so carefully enumerated by Mr. Little simply exist in his imagination, or possibly he is confounding the De Brouwer coke-conveyor with some other make. However this may be, our conveyor has been in use over four months; and during this period it has removed the whole of the coke produced for sale from our No. 1 retort-house at the Litchurch Gas-Works, which contains 288 retorts (all of which have been at work), without either hitch or breakdown during this winter.

So far, the repairs are practically *nil*, and the wear and tear less than anticipated, considering the gritty and grinding nature of coke. The coke loaded into railway trucks or carts from overhead hoppers filled by the conveyor is about equal to hand-loaded; and we have sent hundreds of trucks away to various customers without complaint as to the size of the coke or its quality. The breeze made, so far as we are at present able to ascertain, is not greater than when the coke is wheeled and loaded by hand labour. Of course, if coke is elevated 15 to 20 feet or more, and then allowed to drop without the fall being arrested in some way, it will get broken; and so would most other things.

It is not my intention to advocate the De Brouwer conveyor to the exclusion of other coke-handling plants, many of which I am informed are efficient, and doing excellent work, and will certainly yield handsome interest on the capital outlay if installed with due regard to the work to be performed—to say nothing of their convenience and assistance. It is simply to state my experience with the De Brouwer coke-conveyor, which has, in my opinion, been unduly condemned by your correspondent.

We have dispensed with coke-wheelers for our No. 1 retort-house at Litchurch, and have relied solely upon the coke-conveyor, and have found it of great utility. It has effected a considerable saving in the laborious and arduous work of wheeling coke, and screening and loading same into carts or trucks, which fully confirms the favourable opinion expressed by those who have had longer experience with this type of conveyor. There is no doubt the installation of a coke-handling plant will, for the comparatively small amount of capital outlay, effect probably a greater saving than any other class of retort-house labour-saving machinery.

Derby, Feb. 15, 1902. J. FERGUSON BELL.

Inclined Retort Installations.

SIR,—If none of the engineers of gas-works take up Mr. Marshall's challenge in his letter in this week's "JOURNAL," I shall be very pleased to supply you with the detailed drawings, and all possible particulars of an inclined retort installation, which we completed a few months ago. Our contract included the retort-house, roof, and every part connected with the carbonizing plant; and the results of working have been in every way satisfactory to the Directors of the Gas Company who entrusted us with the contract.

Smethwick, Feb. 12, 1902. GILBERT LITTLE.

The Conveyors at the Zurich Gas-Works.

SIR,—I notice in your issue for Feb. 4 an article by Mr. Archibald Little, on the Zurich Gas-Works, in which he calls the Kreiss conveyors "trumpery things." May I draw your attention to the fact that the patent swinging conveyor, which has been recently illustrated and described in your paper, is the same appliance as the one referred to in the article. I have no reason to believe that the conveyors at Zurich are in any way wanting in efficiency, or else they would not have given repeated orders for new lots. I may, however, mention that I have personally made considerable improvements in the conveyors in all possible directions. These improvements have little to do with the efficiency of the conveyors, but mostly with their balancing.

Feb. 11, 1902. G. F. ZIMMER.

Water Profits at Sheffield.—The Water Committee of the Sheffield Corporation have just resolved that the sum of £13,218, being the amount paid out of the district fund and the general district rate up to the present time, in respect of the costs, charges, and expenses incidental to obtaining the Sheffield Corporation (Water) Act, 1887, shall be transferred from the accumulated profits of the water undertaking to the credit of the district fund, and that the annual charges for interest and sinking fund in respect of the loans raised for payment of these expenses shall in future be paid by the Water Committee.

Complaints of Oldbury Gas.—At the last meeting of the Oldbury District Council, Mr. J. W. Wilson, M.P., in moving the adoption of the Gas Committee's report, called attention to the improved lighting in different parts of the district. Many complaints had, he said, been made about the quality of the gas; but in every case it had been found, upon examination, that something was wrong with the fittings. It had been stated that there were bad smells from the water gas; but they had it on the highest authority that this gas caused less smell in combustion than the other. Mr. Bone complained that his wife, assistants, and shopkeepers were suffering in health through the smell of the gas; and he had been asked to prepare a petition to the Council on the subject. It was simply killing them. The Gas Manager (Mr. A. Cooke) said there was an escape of gas at Mr. Bone's shop, and it had been rectified. Mr. Bone said he could get more than 200 shopkeepers in the town to protest against it. Several complaints were also made about the bad quality of the gas; but Mr. Wilson pointed out that the matter was under the consideration of the Gas Committee, who would endeavour to give satisfaction to all concerned.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills read a second time: Caterham and District Gas Bill, Margate Corporation Water Bill, Rickmansworth Gas Bill, West Hampshire Water Bill, Whitstable Improvement Bill, Wrexham Water Bill.

Petitions have been presented against the following Bills: Abertillery Urban District Council Bill, Birmingham Corporation Water Bill, Bradford Corporation Bill, Bristol Water Bill, Buxton Urban District Council Bill, Darley Dale Water Bill, Devonport Corporation (Water) Bill, Devonport Water Bill, Leicester Corporation Bill, Longwood Gas Bill, Margate Corporation Water Bill, Menai Bridge Urban District Council Bill, Rhondda Urban District Council Bill, Weardale and Shildon District Water Bill, Ystradfellte Water Bill.

The Hamilton Gas Provisional Order Confirmation Bill, to confirm a Provisional Order under the Burgh Police (Scotland) Act, 1892, was presented by Lord Balfour, read the first time, and, pursuant to the Private Legislation Procedure (Scotland) Act, 1899, deemed to have been read a second time and reported from the Committee.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bill presented and read the first time: Halifax Corporation Bill.

Bills read a second time and committed: Bournemouth Gas and Water Bill, Broadstairs Gas Bill, Fareham Gas Bill, Huddersfield Corporation Bill, Limpsfield and Oxted Water Bill.

Petitions have been presented against the following Bills: Abercarn Urban District Gas Bill, Bedford Corporation Water Bill, Belfast Corporation Bill, Birkenhead Corporation Bill, Broadstairs Gas Bill, Bromley Gas Bill, Chard Gas Bill, City of London (Streets) Bill, Commercial Gas Bill, East Worcestershire Water Bill, Fareham Gas Bill, Grand Junction Water Bill, Huddersfield Corporation Bill, Kent Water Bill, Knaresborough Improvement Bill, Leamington Corporation Bill, Limpsfield and Oxted Water Bill, Liverpool Corporation Bill, London Water (Purchase) Bill, Newport Corporation Bill, North Warwickshire Water Bill, Reading Gas Bill, Shepton Mallet Gas Bill, South Metropolitan Gas Bill, Ticehurst Water Bill, Tipton Urban District Council Bill, Wadhurst Gas Bill, West Ham Gas Bill, Wolverhampton Corporation Water Bill.

Mr. Boulnois has given notice that on the motion for the second reading of the London Water Bill he will move that it be read a second time that day six months. On the same occasion, Mr. Sydney Buxton will move: "That this House, while welcoming the adoption of the principle of purchase and the creation of a special Court of Arbitration, is of opinion that the authority proposed to be created for the purchase and control of the water supply of London is unsatisfactory and unworkable, and repugnant to the general principles of municipal government." Sir Samuel Scott intends to ask the President of the Local Government Board whether he is prepared to insert in the London Water Bill a clause protecting the consumers of water in the area of the Metropolis supplied by the West Middlesex Water Company from the loss of the discount on their water-rates to which by law they are now entitled.

The Committee of Selection presided over by Mr. Halsey, decided on Friday that the group of Bills containing the London Water Purchase Bill, the Grand Junction Water Bill, and the Kent Water Bill (Group A) should be proceeded with, by a Committee to be appointed on Tuesday, the 11th prox. Mr. Boyce, representing the Board of Trade, pointed out that the Government Bill had not yet passed a second reading, and it would be inconvenient for the other London Water Bills to be taken before that stage was decided. He had no authority, however, to suggest that the Water Bills should be taken out of the group. Mr. Cripps, for the London County Council, said that the Bills of the Water Companies proposed to extend the area of supply, and therefore they would be affected by the Bill of the Government. The Chairman remarked that if the Purchase Bill were passed, it would be unnecessary to go on with the other measures. He said the Water Bills should be put last in the group.

The grouping of Bills by the Committee so far stands as follows:—

Group A.—Commercial Gas Bill, West Ham Gas Bill, City of London (Streets) Bill, South Metropolitan Gas Bill, London Water (Purchase) Bill, Grand Junction Water Bill, Kent Water Bill.

Group D.—Broadstairs Gas Bill, Bromley Gas Bill, Bedford Corporation Water Bill, East Worcestershire Water Bill, Higham Ferrers and Rushden Water Bill, North Warwickshire Water Bill, Wolverhampton Corporation Water Bill.

Group E.—Abercarn Urban District Gas Bill, Chard Gas Bill, Shepton Mallet Gas Bill, Fareham Gas Bill, Limpsfield and Oxted Water Bill, Newport Corporation Bill, Ticehurst Water Bill, Wadhurst Gas Bill.

Group F.—Belfast Corporation Bill.

A return prepared by the Statistical Officer of the London County Council (Mr. E. J. Harper) shows that the total charge on the rates in respect of loans for local or county purposes has increased from £2,820,489 in 1899-1900 to £3,042,983 in 1900-1901, or from an average of 18·28d. to 19·48d. in the pound. The debt outstanding has increased from £46,268,871 to £49,917,374, or from 1·25 to 1·33 years' rateable value. Of this, £4,275,487, or 0·11 year's rateable value, is for purposes which do not involve a charge upon the rates.

LEGAL INTELLIGENCE.

SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

Friday, Feb. 14.

(*Before the* MASTER OF THE ROLLS *and Lord Justice* MATHEW.)

Bray v. Milne—The Disclosure of Trade Secrets.

This was an appeal from a decision of Mr. Justice Jelf at Chambers, varying an order made by the District Registrar at Leeds for the inspection by the plaintiff of the defendants' premises.

Mr. ELDON BANKES, K.C., and Mr. LUSH appeared for the plaintiff; and Mr. M'CALL and Mr. COMPSTON represented the defendants.

Neither of the leaders being present when the case was called on, and it being found impossible to postpone it,

Mr. LUSH opened the case. He said the plaintiff was Mr. George Bray, who sought to restore the order made by the Registrar, which allowed him to have inspection of certain gas-burners, and the apparatus used for making them, in the possession of the defendants, Messrs. Milne and Son, Limited. Mr. Justice Jelf had cut down the order by allowing inspection of only some half-dozen articles in defendants' possession. The case was somewhat peculiar. The action was brought by Mr. Bray, who for many years had carried on a large business in Leeds in the manufacture of gas-burners, and had a secret process of his own for making them. He had invented a machine, and also a composition of which clay formed an ingredient, by which he was able to put on the top of a brass burner a small white tip which economized the gas used, and increased the light-giving power of the burner. He had not patented his invention, because he had successfully—until the defendant and other persons conspired together to deprive him of his invention—relied on the fidelity of his employees, who were all put under contract, when they entered his service, not to disclose to anyone else the machinery, the composition, or the mode of making the burners. He was bringing this action, first, for an injunction to prevent defendant utilizing the information fraudulently given by two co-defendants named M'Culloch and Duncan, old servants of his, to restrain them from giving, and Messrs. Milne and Son from using, information or material improperly obtained from the plaintiff; and he asked damages from Messrs. Milne and Son for maliciously procuring the other two defendants, and other persons, to break their contracts by imparting this information, and by handing over to them the composition used for the purpose of making gas-burners. There was no pretence for saying that Mr. Bray had not been defrauded; and, under the circumstances, the District Registrar made the order which he now asked should be reinstated. M'Culloch was a man who had been employed for some years as foreman in the gas-burner department of plaintiff's works, and Duncan came into his service in 1900. He was a clever mechanic, employed in making or attending to the machinery used in making burners. After remaining with him for some months, Duncan was dissatisfied, and left. On doing so, he wrote two letters, saying in one that he had accepted a situation with another firm, and should do his utmost for them, as he was justified in doing, as his services were not worth retaining by the plaintiff; and in the other, that as the plaintiff had not thought it worth while to retain him, he would have to pay for it.

Lord Justice MATHEW here asked why Mr. Justice Jelf cut down the order.

Mr. LUSH said his Lordship thought it would not be right to allow the plaintiff to inspect more than some half-dozen articles which were proved to have been stolen by Duncan, who had been prosecuted, convicted, and sentenced to nine months' hard labour.* M'Culloch also was prosecuted; but, considering his age, Mr. Bray did not press the charge against him. The defendants, Messrs. Milne and Son, had in their possession some half-dozen or dozen articles actually stolen by Duncan from the plaintiff; and he could show, by their letters, that they had been using them for the manufacture of gas-burners to compete with him.

Mr. COMPSTON protested against the statement that anything found on his clients' premises had been stolen from the plaintiff.

Lord Justice MATHEW said, passing that by, were not the defendants bound to show the gas-burners they were making, which it was said were imitations of the plaintiff's?

Mr. COMPSTON said certainly they would show any gas-burners; but the order of the Registrar, which they successfully appealed against, was that the plaintiff should be at liberty, by himself or his agents, at all reasonable times, and as often as might be necessary, to "enter into all or any of the works or places of business of the defendants, and inspect and examine all machinery, parts of machines, appliances, materials, drawings, plans, and receipts in the possession, custody, or power of the defendants or their agents, used, or which might be used, by the defendants in the production or manufacture of gas-burners, or any part thereof."

Lord Justice MATHEW remarked that this went a good deal beyond gas-burners.

Mr. LUSH said no doubt it was a wide order; but the circumstances were exceptional. Soon after Duncan had gone, and after he had entered into the service of Messrs. Milne and Son, it was ascertained that he had taken a room in Leeds, in which he had been making gas-burners. Mr. Bray, having his suspicions, got someone to take the premises on a weekly tenancy, and when he got there he found in the room parts of machines, parts of burners, and apparatus, which had been actually taken by Duncan from the plaintiff's premises; and on the floor were fragments of paper which, when pasted together, proved to be a letter from Duncan to M'Culloch, asking him to procure certain pieces of apparatus. On this a search-warrant was applied for, and the premises of Duncan, M'Culloch, and Messrs. Milne and Son were searched by a police inspector. On Duncan's premises were found a complete set of plans and tracings of machines, and various receipts for processes, and also a complete equipment for making gas-burners,

* See "JOURNAL," Vol. LXXVIII., p, 1040.

including some articles which had been actually stolen from plaintiff. In M'Culloch's place were found the originals of the plans and tracings and a machine for making one of the peculiar manufacture of the plaintiff's. Then they searched Messrs. Milne and Son's premises; and his friend, though he had an opportunity of making an affidavit to explain these facts, declined to make one.

Mr. COMPSTON said he had made one.

Mr. LUSH said at any rate he declined to use it. At Messrs. Milne and Son's they found another of these union-jet tip-making machines, which was entirely of plaintiff's contrivance, parts of apparatus, and gas-burners, obviously manufactured by the defendants in agreement with Duncan. Criminal proceedings were taken against these two men; and in the course thereof Mr. Helps, Messrs. Milne's Manager, was subpœnaed to produce a bundle of letters which had passed between Duncan and Milne. Among them was a letter from Mr. Helps himself to Messrs. Milne, dated May 11, 1901, which referred to the death of their burner maker, and contained other passages which led the plaintiff to demand the production of the letter from Mr. Milne to which this was the answer. This Messrs. Milne refused, and, after a long argument, the Stipendiary decided that it could not be evidence against Duncan, and therefore he could not require its production. It was, however, a very suspicious circumstance. The present action, which had been delayed by the criminal proceedings, was then gone on with, and an interim injunction was applied for. When the matter came on again, after an adjournment at defendants' request, in order to answer the plaintiff's affidavits, defendants' Counsel declined to use the affidavit which his client had made, and declined to produce the letter from Mr. Milne to Mr. Helps. The learned Judge thought that the circumstances were suspicious, and granted an injunction until the trial; and this had never been appealed against. He submitted that the plaintiff was entitled to the fullest order for inspection of the defendants' premises; otherwise it would not be possible for him to know whether or not the injunction had been obeyed.

Their Lordships here intimated that Mr. Lush had made out a *primâ facia* case, and called upon the respondent.

Mr. COMPSTON submitted that there was not even a *primâ facie* case made out for an order in such sweeping terms as the plaintiff was asking for, which went much farther than the Court had ever gone. He referred to the cases of *Singer Company v. Wilson* and *Germ Milling Company v. Robinson*, where the inspection orders were much more limited. He said he had no objection to reasonable inspection.

Mr. M'CALL, who had now come into Court, further pressed their Lordships not to restore the order of the District Registrar in its full stringency. He said this was the first time in his experience that he had heard of an order under which one trader was given a roving commission over the whole premises of his rival, to go whenever he pleased, and as often as he thought fit.

Lord Justice MATHEW: The circumstances are not very common.

Mr. M'CALL submitted that the order should be to inspect any appliances which were in question in the action. It was nothing less than oppressive that Mr. Bray, who was admittedly a rival of Messrs. Milne and Son, should be entitled to inspect the whole of their premises, and learn everything that was going on there. It was an unheard-of order.

A discussion here ensued, as the result of which it was arranged that the order should be modified. The defendants were to make an affidavit verifying what Mr. M'Call had stated (on instructions) was the fact—that the manufacturers of gas-burners was conducted in a separate department at the Leeds works, and nowhere else; and the plaintiff was to have complete inspection of that department. In case any difficulty arose, liberty was given to apply to the Court; and the costs of the appeal were reserved.

WEST BROMWICH POLICE COURT.

Thursday, Feb. 13.

(*Before a* BENCH OF MAGISTRATES.)

Alleged Falsification of Accounts by a Gas-Works Clerk.

To-day, *Joseph Turner* (aged 23), a clerk in the employ of the Birmingham Corporation, was charged with falsifying the accounts of his employers, and also with stealing two sums of money, during last month.

Mr. REAY NADIN prosecuted; and Mr. J. CLARK defended.

Mr. NADIN, in opening the case, said prisoner had been employed at the Swan Village Gas-Works of the Birmingham Corporation for a period of seven years, and for some time past had been second clerk. The charges were falsification of accounts on Jan. 9, larceny of £1 on the following day, falsification of accounts on Jan. 16, and larceny of £3 on Jan. 17. The falsification of accounts had been going on for some considerable time—about two years—and started with very small sums. What the total amount of the defalcations was, he was not able to say; but it would be at the least £230. The manner in which the accounts had been falsified needed some considerable explanation. It appeared that the wages-books were made up on Thursday by Mr. Mackintosh, the Chief Clerk, with the prisoner and another junior clerk. In making up the books, Mr. Mackintosh checked the time, and placed the amount against the workman; and as the Chief Clerk called out the various amounts, prisoner replied "correct" or "incorrect" as they might be. The books were generally made up about luncheon time; and Mr. Mackintosh and prisoner would leave for lunch. He was in a position to prove that prisoner was in the habit of coming back to the office on Thursday, at about a quarter to two; and he suggested that during this interval, and in Mr. Mackintosh's absence, prisoner inserted certain figures in the books. Mr. Mackintosh would hand the books to prisoner to check the amounts and total them up; and a very suspicious circumstance, and one of great bearing on the case, was that Turner was in the habit of taking the books out of the general offices into the Superintendent's private office in the absence of that gentleman. He suggested that prisoner so arranged the particular figures that, when the Pay Clerk arrived and paid the respective workmen their wages, the additional amount did not get into the hands of the workmen. The Chief Clerk arrived on Friday mornings, and after looking in the books he would see the total amount, probably £102; and he would take this money out and place it in front of prisoner and another clerk. It was prisoner's duty to count the money out and hand the amounts to the Pay Clerk to be placed in small tins. Prisoner had the books in front of him; and while he was counting out the various sums due to the workmen, he had ample opportunity of taking, and did take, the different amounts that had been inserted in the books. Prisoner was said to be an adept at sleight of hand, and was very fond of showing how he could manipulate coins. The books would afterwards be placed in the safe, which was not locked up; and in fairness to prisoner, he must say it would be accessible to other persons. But prisoner was the only man who would have, besides the Pay Clerk, anything to do with the handling of the money. Prisoner was in the habit of coming to the works on Sunday mornings, although not on duty, and at a time when he was not expected; and he would remain there for about a quarter-of-an-hour. He submitted that during this period the figures which had been erased could be re-inserted, in order that the books would be in proper order when examined at the Council House on the following Monday morning. On Jan. 9, Mr. Mackintosh checked the time-sheet of a man named Bird, and inserted in the wages-book 7s. 9d., and not £1 7s. 9d., as now appeared. Turner and the Chief Clerk left the office for dinner; but the former returned at 1.45, and he had then an opportunity of altering the books. He would prove that the man Bird only received 7s. 9d. as wages on Jan. 10, and also that prisoner visited the works on the following Sunday, went into the office, and remained there for about half-an-hour. With reference to the other charges, the books were made up on Jan. 16; the sum due to a man named Woodley being 12s. 6d., to another named Bird 17s. 10d., and to a third named Woodbine 16s. 8d. To each of these sums £1 had been added, erased, and then re-inserted; and he would prove that prisoner again visited the works on Sunday. The man Woodbine was unable, on account of illness, to fetch his money; and it was then found that 16s. 8d. was due to him, and not £1 16s. 8d., while there were clear indications in the books that the figure of £1 had been struck out and re-inserted by someone. He would also show that the prisoner, who was only in receipt of a salary of £60 to £65 per year, was in the habit of spending money in a much freer way than could be expected of one in his position.

Mr. CLARK said prisoner was only arrested late on Tuesday night; and he was released on bail on Wednesday. He understood from his information that there was only one charge of stealing £3; but the charges preferred—four in all—appeared to be of a more serious nature. He therefore applied for a remand for a week, in order for him to take instructions from his client.

Mr. NADIN did not object to the application.

The Bench remanded prisoner for a week, and granted bail—himself in £50, and two sureties of £25.

Mr. NADIN said he would afford Mr. Clark every facility for examining the books.

The Haslingden Gas Explosion.

At last Manchester Assizes, Mr. Justice Wills and a Special Jury were occupied with an action brought by Mr. W. H. Worsley-Taylor, K.C., M.P., to recover from the Mayor and Corporation of Haslingden damages for injury to his property. Mr. Pickford, K.C., and Mr. Mellor were for the plaintiff; and Mr. Horridge, K.C., and Mr. Acton represented the defendants. The claim arose in respect of damage caused to the Rising Bridge Inn by an explosion of gas in April last year. The allegation of the plaintiff was that gas accumulated in the house through an improperly constructed sewer. The defence was that there was an escape of gas in the house through a defective chandelier. Evidence was given in support of the contention that gas reached the house through the sewer-way, and it was submitted that damage to the extent of £385 was done by the explosion. Mr. Horridge argued that the chandelier was entirely to blame; his point being that it was cracked, and insufficiently charged with water. Further, he submitted that the character of the earth between the gas-main and the house was such as to make it impervious to water or gas. One of the principal witnesses for the defence was Mr. Thomas Newbigging, who expressed the opinion that the chandelier was at fault. He had examined the sewer, and found no evidence of scorching such as he would have expected to find if a flame had travelled along it. Asked by Mr. Pickford if he could suggest any source from which the gas could have escaped into the house, supposing the chandelier was supplied with its full charge of water, he said he could not. Mr. F. S. Burton, who was for eight years Borough Engineer of Burnley, was called to show that the sewer trench was in strong clay and impervious to gas. His conclusion was that there had been an escape of gas from the chandelier. Mr. T. Duxbury gave evidence to the same effect. Justice Wills having summed up, the Jury retired to consider their verdict. After an absence of an hour, they reported that they could not agree. His Lordship asked them to reflect what a serious thing it would be if the parties had to fight the case over again, and they once more retired. They returned into Court, after a further absence of more than two hours, with the announcement that they could not come to an agreement; and they were accordingly discharged.

Water Charges to Railway Companies.

For the past six years, the East and West Yorkshire Railway Company have been supplied by the Rothwell Urban District Council with water for their engine-sheds at Carlton, at the uniform charge of 1s. 1d. per 1000 gallons. The Company, however, having ascertained that the Midland Railway Company (under an agreement with the Council) were only charged 8d. per 1000 gallons for the water they took, declined to pay for last year's supply at the old rate, and deducted £82 from the amount of the account. To recover this, the Council last week summoned the Company before the West Riding Court, Wakefield. The Bench, however, held that the Court had no jurisdiction, as the amount

claimed exceeded £20. Counsel for the Company stated that, apart from this point, he had a complete defence in the Council having given an undue preference to another company.

Water-Rates on Houses having Interior Communication.

A somewhat curious case was heard at Chichester last week, when the Bognor Water Company brought an action against Mrs. Kingman to recover £3 11s. 3d., alleged to be due in respect of water-rates. The defendant was the owner of Nos. 9 and 10, Rock Gardens, Bognor; and a supply of water from the Company's mains was laid on to the former house; but not to No. 10. The two houses, however, are connected with each other by interior communication; and the circumstances were such that the Company felt justified in claiming water-rates on the combined rentals, as if the houses were one. The total rent of the premises was £75 per annum. The defence was that No. 10 had its own supply of water from a pump connected with a well, and that none of the Company's water from No. 9 was taken for use next door. Defendant, it transpired, was in the habit of letting the houses furnished or in apartments; but since October last No. 9 had not been tenanted except by herself. The Judge decided that the defendant was liable for the proportion of rates due in respect of No. 9; and he made an order accordingly. With regard to No. 10, however, he held that she was not liable.

Imprisonment for Robbing Gas-Meters.

At the Rotherham Borough Police Court yesterday week, a labourer named Albert Reed was charged with having stolen 2s. 2d. from a penny-in-the-slot meter, the property of the Rotherham Corporation. The Town Clerk prosecuted. He stated that this class of offence was becoming sadly too common, and asked the Bench to impose exemplary punishment. The meter inspector, it seems, on going to the defendant's house found the lock of the meter had been broken and 2s. 2d. stolen. Defendant had previously been convicted of a similar offence, and was now sentenced to three months' imprisonment.

Theft from a Prepayment Meter.

A married woman named Mary Cole was charged at the Plymouth Police Court yesterday week with stealing 2s. 8d. from a slot meter, the property of the Plymouth and Stonehouse Gas Company. Mr. R. B. Johns, who appeared for the Company, said that some time ago they overlooked a case in which the prisoner abstracted money from the meter which was fixed in her house. Now that a second case had occurred, they felt that a prosecution was necessary. Evidence was given by two officials engaged in collecting from the slot meters, as to the meter having been locked on the 14th of January, while on the 4th inst. it was open, and the money gone. Prisoner told a detective that she took the money because her husband was out of work; but this was found to be untrue. The Chief Constable said the woman spent her time in public-houses. The Company did not press the case; and the Magistrate imposed a fine of only 10s., but warned defendant as to her future conduct.

Removing Water Stand-Pipes.

In the year 1895, Mr. B. J. Young, a property owner of Handsworth, had some cottages supplied with water by standpipes. Five years later, the Handsworth Urban District Council concluded that the standpipes were wasteful, and gave notice that a direct supply must be substituted. Mr. Young did not comply with the request that he should put in a direct supply; and the Council refused cheques in payment for the water until he should do so. Owing to changes in the Council and other causes, the notice was not carried out until June 24 last, when the Council made a payment in compensation to Mr. Young for apparatus thrown out of use. When this had been done, the Council asked for payment of arrears, as well as of the current rates; but Mr. Young's answer was that, having once tendered payment, and it having been refused, he could not be liable. The Council therefore instituted proceedings against him to recover £6 9s. 5d., the amount due for water supplied between March 26, 1900, and Sept. 24, 1901. The case was heard last week at the West Riding Court, when Mr. Young said the whole question arose out of an illegal and inequitable proceeding on the part of the Council. He contended that it must be proved that there was an agreement between himself and the Council after March, 1900—the date of the order for the removal of the standpipes. The Bench, however, considered that the application was good, and made an order for payment of the amount claimed, with costs.

The Calcium Carbide Patent Case.—We understand that the Acetylene Illuminating Company, Limited, are appealing from the judgment of Mr. Justice Buckley, delivered on the 3rd inst., in the action which they brought against the United Alkali Company, Limited, as reported last week, p. 355.

Site Selected for the Black-Country Mond-Gas Works.—The Directors of the South Staffordshire Mond Gas Company have, we believe, completed arrangements for the purchase of land, situated between Tipton and Dudley Port, on which they propose to erect the works required to supply gas to the Black Country districts embraced in their Act of last year.

Serious Accident to a Gas Manager.—While Mr. Alfred E. Ashley, the Secretary and Manager of the Neston and Parkgate Gas Company, Limited, was engaged attending to a generator furnace, the temporary bars gave way, and allowed the whole of the hot producer coke to fall into the pan below, with the result that he was severely scalded about the face, arms, and legs. We are pleased to learn that he is progressing as well as can be expected, under the circumstances. Pending the arrival of medical aid, Mr. Ashley telegraphed for the assistance of Mr. T. Holland Harwood, who promptly responded in person, and secured the continuance of manufacturing operations.

MISCELLANEOUS NEWS.

SOUTH METROPOLITAN GAS COMPANY.

The Ordinary Half-Yearly General Meeting of the proprietors was held on Wednesday last, at the Cannon Street Hotel—Mr. GEORGE LIVESEY in the chair.

The SECRETARY (Mr. Frank Bush) read the notice convening the meeting, and the report, already given, was taken as read.

The CHAIRMAN: Ladies and gentlemen, I have much pleasure in moving the adoption of the report and accounts. The first paragraph deals with two very important matters, both reductions—one is the reduction of price and the other is a reduction of illuminating power. Unfortunately, a year-and-a-half ago, in consequence of the great rise in the price of coal, there was an increase in the cost from 2s. 1d. to 2s. 4d., and then to 2s. 8d. per 1000 cubic feet. That we considered a most unfortunate circumstance. In June last, we took off 5d.; reducing the price to 2s. 3d. per 1000 cubic feet. We made the reduction as large as possible, and we were in hopes that in the result the accounts would be about level. I am sorry to say that, in consequence of the still greater relative fall in the price of coke than in the price of coal, there is a deficiency of about £18,000 on the half year. But as there was a surplus of at least £21,000 in the June half year, we make up the deficiency by drawing on the undivided balance, and leaving £3000 to be carried forward. The price of coal has gone down 6s. 11d.—viz., from 19s. 9d. to 12s. 10d. Whereas the reduction in the cost of coal has reduced the outlay on this account to £386,000, or about £166,000, the reduction in the price of gas takes off £64,000 from the revenue; and the reduction in the receipts for products takes off £76,000. So that whatever we save in coal has practically all been lost by the reduction in the price of gas and coke. One reason why the fall in the price of coke is greater than was expected, has been the arsenic scare. You will all remember that some time since—rather more than a year ago—a number of people were poisoned in the neighbourhood of Manchester from drinking beer; and it was found that this beer contained a certain amount of arsenic. The arsenic was contained in some of the invert sugar or glucose that was used in the manufacture of beer. But then it was found that there was a certain amount of arsenic in malt; and this was traced to coke. The result has been that, whereas previously there had been a large demand for coke for the purpose of malting, that demand has entirely ceased, and the large quantities of coke hitherto used for the purpose were thrown on the market. Whenever there is a surplus of coke in any of the provincial towns, London is the emporium to which it is often sent. If I had my way, and the London Gas Companies would work together, for every train load of coke sent from Leeds, Birmingham, or Nottingham, I would send another train load back to the town that sent it. Not that I object to competition; but it is so commonly the practice to keep up the price in their district by selling it at a low rate to go elsewhere, which is most unfair; and the only way to meet it is by turning the tables on them. That is one great reason why the price of coke has fallen more than was expected. However, the result is we pay the same dividend that we paid last time; whereas we had been hoping we should be able to give an increased dividend and have paid 5¼ or 5⅜ per cent. However, these things have to be borne; and the shareholders of the South Metropolitan Company have always accepted them very philosophically, and very good naturedly. I can only express the hope that it will not be long before we are able to come before you with an increase of dividend. So much for the reduction in the price of gas. The reduction in illuminating power is the other important question. We had some difficulty—I will not say to persuade the Parliamentary Committee, because it was an exceedingly able and intelligent Committee—I will say we had no difficulty in persuading them. We put our evidence before them, and persuaded them; but we were opposed by the London County Council. That is a well-meaning body; but unfortunately they do not know everything, and they got the impression that it was absolutely necessary for the consumers of London to maintain the quality of gas up to 16 candles. In fact, quite recently, in the discussions which took place in that body, one member said: "We have been using our utmost efforts to compel the Companies to maintain the 16-candle standard; and here Parliament is stepping in and upset it all, and has declared that it was no longer necessary." Parliament accepted our statement, and agreed that the standard of illuminating power should be reduced from 16 to 14 candles. The arguments we put forward were strong—in fact, so strong, I think, that the Chairman of the Committee said to me when I had given my evidence: "Why do you stop at 14 candles?" My answer was: "Because I think it is as much as Parliament can swallow at one dose." It was inducing Parliament to reverse its policy of half-a-century. Well, what was said about it was that if we reduce the illuminating power by 1 candle—that is, 6 per cent.—the consumers will have to burn from 16 to 18 per cent. more gas to get the same amount of light. If so, our accounts ought to have gone up immensely. From June last, we reduced the standard to 14 candles nominally; but practically we only reduced the quality from 16¼ candles, or about that, to 15¼. So for the last six months the consumers have had gas of 1-candle power lower than they had previously. If the arguments of our opponents were sound, the result would have been that, with the reduction of 6 per cent. in the illuminating power, there would have been an increase of at least 16 per cent. in the gas consumed. Well, they were totally wrong. There has been no appreciable increase whatever in consequence of the reduction in illuminating power. It is proved, I think conclusively, that the consumers have not suffered in any degree whatever. They have not increased their consumption at all. As stated in the paragraph in the report, there are two or three arguments put forward in support of this contention. The Crystal Palace District Gas Company have a district adjoining, and half surrounded by, the South Metropolitan. The two Companies go pretty nearly on all-fours with regard to the increase of business. Before the great rise in the price of coal, they were both getting about

6 per cent increase. Then came the increase in the price of gas; and the increases of both Companies dropped practically to *nil*. They both reduced the price again last June; and their increases are almost exactly the same. In fact, the South Metropolitan Company's increase is 6¾ per cent., and the Crystal Palace Company's is 6⅞ per cent. They have not altered their illuminating power at all. I think, therefore, it is a fair deduction that we should have had this increase of 6¾ per cent. if we had not altered the illuminating power. But there is another point—the complaints of bad lights. One might have expected that if there had been such a great falling off in the light obtained from the gas, there would have been a large increase in the complaints of bad light. As a matter of fact, the complaints as to bad lights have diminished; they have been actually less in the past half year than in corresponding half years—rather considerably less, but I attach no importance to that. The fact that they are less is again conclusive proof that the consumers had not suffered in any way whatever. I have heard of only one consumer who objected to the reduction of illuminating power. This gentleman, living at Streatham, said he wished the Company had kept up the illuminating power and not reduced the price 2d. in proportion. He would rather have had the higher quality gas. But when I tell you that this poor gentleman is stone blind, I think you will understand that his evidence is not of very much importance in this matter. I have said a little about the accounts, and I have said something about coke and other matters and the dividend; and now I wish to make a comparison between this period and twelve years ago. Twelve years ago, we were selling gas at the same price as that at which we are selling it now—2s. 3d. per 1000 cubic feet. We had got down to 2s. 3d. in 1889, and that is the price charged at the present day. We have been down to 2s. 1d., and we have been up to 2s. 8d.; but I may tell you that in the whole history of gas there has been no such anxious and difficult twelve years as the last twelve years for all engaged in the manufacture and supply of gas. If I had been told in 1889 that we should be selling gas twelve years hence with an enormously increased consumption at the same price, I should have expressed my great astonishment at anyone venturing to make such a prophecy. But the business has doubled in the twelve years. In 1889, we used 631,000 tons of coal in the year. In 1901, we used 1,184,000 tons—say, 600,000 and 1,200,000 tons. Our business has doubled in the twelve years. We have effected very great savings in the matter of capital. Whereas it required 1s. 0¾d. per 1000 cubic feet to pay interest on capital in 1888-89, for the past half year it takes only 7¾d.—that is, it costs us 5d. per 1000 cubic feet less to pay interest and dividend now than it did twelve years ago; and yet we are selling gas at the same price as we charged then. If other things had been equal, we ought to have been down to 1s. 10d. by this time. Well, that is a very serious question; and it shows the immense difficulties which have surrounded us during these twelve years. We have had practically two coal famines. Previously, there had only been one in the history of gas—in the seventies; but coal went up to a high price in 1891, and it also went up to a very high price in 1900. This enormous increase of business must be borne in mind—the same price of gas and a less dividend, because in 1889 you were getting rather a higher dividend than you are getting now. The dividend is 5 per cent.—that is, equivalent to 12½ per cent. on the old unconverted capital; whereas in 1889 we paid 13¾ per cent. If our Company stood alone, I should feel very unhappy about it; but when I look at the other Companies, I find they are worse off. Whereas we are selling gas at the same price as we charged in 1889, the Gaslight and Coke Company had got down in 1889 to 2s. 6d. In the half year to which I am referring, their price was 3s. 5d., now reduced to 3s.—that is, 6d. per 1000 cubic feet more than it was twelve years ago. The Commercial Company—the other London Company—were selling at 2s. 4d. in 1889; now they are selling at 2s. 8d. The Crystal Palace District Gas Company were selling at 2s. 6d. in 1889; and they are selling now at 2s. 7d. So we are, in fact, a little better off than our friends and neighbours; and that is our consolation and proof that it is not our fault that things are as they are. I have been in the gas business all my life, and I can certainly say that never has there been so anxious a time. It is necessary for the conduct of a business of this kind that the manager should be really strong. In the last twelve years, we have lost our Chief Engineer; he was not strong enough for the work. If, poor fellow, he had given up a year before, humanly speaking he might have been living now. The work was too much for him, and he succumbed. Moreover, we are subject to very great competition. In the days before 1870, there was absolutely no competition whatever. Gas was a monopoly in two respects—there was no competing light, and there were no competing companies. In 1870, came in the cheap mineral oil. When I say there was no competing light prior to 1870, oil at 5s., 6s., or 7s. a gallon could not be considered a real competitor; and candles were no competitor either. But with cheap mineral oil came in a serious competitor. Then, later on, came the electric light. Now there are other lights—the Kitson light, acetylene, and other things—so we have very serious competitors to deal with; and the fact that our Company have held their own against all this competition, and have increased their business 100 per cent. (from 600,000 tons to 1,200,000 tons of coal), is I think proof that we are holding our own. But in regard to this competition, we are very much aided by an invention that has been made. It took place rather before 1889; but it has been developed within the last twelve years. I refer to the Welsbach system of lighting. There is no doubt whatever that it is by far the cheapest system of lighting in vogue; and to my mind it is far pleasanter than any other. The difficulty we have had in connection with the system has been the unfortunate position of the Welsbach Company; and here, as some of you may be shareholders in that Company, let me say I do not wish to hurt your feelings or to tread on your toes. I must say, however, that that Company have managed their business in a way that has not been at all satisfactory to the gas companies. I am not speaking so much of the price at which they sold their mantles—although they were selling them at 1s. apiece a little while ago—but the restrictions, the difficulties, they have put in the way of the use of their burners and mantles, compelling them to be bought at a very high price when both could be obtained at a lower rate but for their contention. While on this subject, I have something, I think, of importance to say. The Welsbach Company had their original patent in 1886. In 1893, they took out another patent. Application was made for this new patent in Germany and on the Continent, but was refused on the ground, I am told, that it was covered by the 1886 patent. In England, however, they obtained a new patent in 1893. On the strength of this patent, they converted the Company from one with a moderate capital into one with the enormous capital of £3,500,000; and to pay interest, they are obliged to charge a very high rate for mantles. The retail price to the public, I believe, is 7½d.; the wholesale price, 5d. But mantles as good as theirs can be made, and are being made, at 1d. to 1¼d. each, and can be sold at 2d. or 2⅓d. each. Well, if the 1893 patent is valid, all I say is let us know it. There was an action with the Sunlight Company, in 1900, and that action was not, I think, fought out. The Sunlight Company were absorbed by the Welsbach Company; when they were on the point of having a judicial decision as to the 1893 patent—just when it came to the point, a settlement was arrived at between the two Companies, and we were left as we were. Since then the Welsbach Company have been proceeding against a number of small infringers—not so much makers of mantles as sellers. There are people in this country making mantles, against whom actions have been laid; but in some extraordinary way the Welsbach Company have shown no disposition to bring them to trial. They must do so very shortly. Now the new management has taken control of the Welsbach Company, they will, I am satisfied, very shortly make a determined effort to get this matter decided. It is to our interests, it is to everybody's interest—it is to the interest of the British public—to have the best form of lighting possible; and the best form of lighting possible is the Welsbach, which should be as cheap as is consistent with all interests. Now these people who have to defend the patent are small people, with very limited means; and I have proposed that the gas companies should form a guarantee fund, not for the purpose of attacking the 1893 patent, but for the purpose of seeing that the action which is brought by the Welsbach Company in support of their patent should be properly defended. I propose that this guarantee fund should be formed by all interested in gas—by the gas companies and the gas corporations—and that it should be vested in a Committee elected by the subscribers, who should have power to use it in such legal and proper manner as they may be advised to carry out the object in view. At present, four companies have been spoken to on the subject; and the guarantee fund at this moment amounts to about £3000. I think £10,000 would be quite enough; and I now wish, from this table, to invite the gas interests generally to communicate with our Secretary, and to inform him whether they will be willing to join in this guarantee fund. Then, when any action may be fought, they will be in a position to see that it is properly defended. I do not want to injure the Welsbach people at all; but it must be remembered that there is a greater interest than even the Welsbach Company to be considered, and that interest is the British public and the gas industry. The only other matter relates to the Company's Bill; but as there will be a special Wharncliffe meeting at the close of the present one, I will defer any remarks I have to make until that is before you. Let me repeat this about the Welsbach matter—that a guarantee fund shall be formed, to be administered by a Committee in such fitting and legal way as they may be advised, in order to secure that a proper trial shall be given to the actions that are now pending. I have now to move the adoption of the report.

Mr. JOHN EWART: I beg to second that.

The motion was put and carried unanimously.

Mr. ROBERT MORTON proposed the payment of a dividend at the rate of 5 per cent. per annum.

Mr. C. T. DRUMGOLD (an employee Director) seconded the resolution. The prospect of dividend, he said, is acceptable to all concerned in the Company's welfare. The Directors must be pleased at the successful issue of all their endeavours; the proprietors must be well satisfied that the Company is in such a stable condition. And also the consumers must be well pleased, because they have had the advantage of the lower price of gas; and the employees on every ground must be well pleased, because they, with the shareholders, have everything to gain by the success of the undertaking. In fact, their living is wrapped up in the concern—their living, in the same way as the shareholder's living, is wrapped up in the success of the Company; and the whole policy of the Company is to do all they can to satisfy their customers and to make friends of them. The Company in every way possible induce their employees to do all they can, in whatever department it may be, to work for the best interests of the undertaking; and into whatever department you may examine—whether it be the management or in the manufacture of the gas, or whether it be in the distribution where it comes more directly in touch with our customers—you will find every effort being made. A great deal of this is brought about by the now somewhat famous and almost historical profit-sharing arrangement, by which it is possible for the employees to become partners in the business in which they are at work; and there are at present about 2000 employees who are shareholders. This can only be influencing the work in the right direction. I cannot imagine that it can do anything but good; because if a man has a holding, surely that man must have the interests of the Company well at heart. You make the employee one who shares in all the vicissitudes of the Company; you make him responsible, and he becomes a partner. Every advantage that the Company have is shared by the proprietors and by their employees; so that whatever happens in the way of advantage, the employee has it—whether it be bonus or dividend—if he is a shareholder. Besides the mutual material advantage that exists, there is also the created feeling of cordiality which formerly did not so well exist, and in many undertakings does not exist now. In fact, this profit-sharing scheme, this system of co-partnership, is a golden bridge which unites the capital of the Company with its labour. There, of course, is the secret of the success again. You have a body of friends. The whole policy of the Company is to make friends, not only of its employees, but also of its customers.

The resolution was put, and carried unanimously.

The CHAIRMAN, in moving that Captain Thomas Bridges Heathorn be elected a Director of the Company, said this gentleman was one of

the oldest Directors; his father having been one of the founders of the Company.

Mr. COOPER said, having known the Captain for so many years, he should be happy to second the motion.

The resolution was carried unanimously.

The CHAIRMAN next moved the re election of the second oldest Director—Mr. Simpson Rostron. He said this gentleman had been a Director for a good number of years, and had taken the deepest interest in all the concerns of the Company. He had therefore much pleasure in proposing his re-election.

Mr. COOPER seconded the motion, which was carried unanimously.

Captain HEATHORN said he was much obliged for the honour done him in re-electing him a Director of the Company. As the Chairman had said, he was the oldest Director, and had always taken the greatest possible interest in the Company—in fact, he did not know what he should do if he severed his connection with the Company.

Mr. SIMPSON ROSTRON also expressed his gratification at receiving a renewal of the confidence of the shareholders. He was getting rather an old Director, having been for twenty-four years upon the Board. When he was elected, the Company was a comparatively small one on the south side of the river; but now it was the second largest Gas Company in the world. He had always taken a very great interest in it, and he felt it a great honour to be elected on the Board in 1878; and now that it had achieved its present position, through the abilities of their excellent Chairman, he felt the honour very much greater.

The retiring Auditor, Mr. G. M. Footner, having been unanimously re-elected,

The CHAIRMAN said that was all the business to be brought before the ordinary meeting.

Wharncliffe Meeting.

A Wharncliffe meeting was then held, to consider the Company's proposed Bill.

Mr. BLYTH (Solicitor) having explained the principal heads of the proposed Bill,

The CHAIRMAN said: It is my duty to move—"That the Bill now read to this meeting, intituled a 'Bill to empower the South Metropolitan Company in acquiring additional land for the manufacture of gas and for other purposes of their undertaking, to make other provisions for testing the gas supplied by the Company, and for other purposes,' be and the same is hereby approved, subject to any amendments that may be made therein by Parliament." The Solicitor has read the heads of the Bill; but there are three points on which it is necessary some explanation should be given. The first is the question of land, the second that of gas testing, and the third the Directors' remuneration. The other questions are mere detail. In 1881, we obtained power to purchase about 100 acres of land at East Greenwich, on which we have erected our works. These works, or about one-third of the contemplated works to be erected there, have been constructed. The other day our Chief Engineer—Mr. Carpenter—said to me: "What will you do when the East Greenwich works are filled up." I replied "I had not thought of that." They will last for some fifteen or twenty years; but the time will come when they will be filled up, and what then? If the present opportunity of acquiring additional land in the neighbourhood is not taken, there will be nothing to be got twenty years hence nearer than Erith; and that will be a very serious matter, and, moreover, it is not desirable to multiply the gas manufacturing stations unduly. It so happens that in the neighbourhood of the present East Greenwich site, there are about 80 acres more or less of still unoccupied land. When I say "unoccupied," I mean unbuilt upon. The Directors resolved to apply to Parliament for power to purchase this land. In the first place, it is necessary to get your consent. You may withhold it if you like, and Parliament may withhold it if they like; but we feel that in bringing it before you and Parliament we are only doing our duty. London will want gas. There is no fear whatever about gas being played out; but I believe the gas that London will want will be a cheap fuel gas. The illuminating power will not be wanted if the Welsbach mantles come into general use, which I hope they will do, through the influence of the gas companies, before long. By the reduction of the illuminating power, we shall be able to make a fuel gas suitable for all purposes, which, we hope, will be cheaper than the present gas; and if so, it will be used for many purposes for which gas is not applicable in consequence of its cost. If we could get a really cheap gas, selling it at 1s. or 1s. 6d. per 1000 cubic feet, there would be no limit to the demand. That is what I believe we have to come to; and if so, land will be wanted on which to construct the works. If Parliament should say that we are looking too far ahead—that they have never heard of gas companies applying for power to take land when they have land which will carry them on for fifteen or twenty years—all we can say is that we are willing to take the burden of providing for the wants of London. I do not think it will be wanted in my time—I am not looking out for myself; but I believe it will be wanted for London. Then you may say Why should we take the burden of buying this land? The burden will not be a heavy one. I do not think the interest on the outlay will amount to one-tenth of a penny per 1000 cubic feet of gas sold; so that the burden will be unappreciable to the shareholders or the consumers. If you say that we are going too far, and refuse to give your assent, there is an end of it. If Parliament says the same, there is an end of it; but we shall have done our duty The next point is as to gas testing. I have alluded to the days of non-competition. Prior to 1870, there was no gas competition. Gas was then an absolute monopoly; and it was in those days that the system of gas testing was inaugurated. That system has been a cause of intense anxiety and annoyance to us ever since. At first, they appointed proper Referees; and in the Act of Parliament, it was stated that one should always be a man of practical knowledge and experience in the manufacture and distribution of gas. They appointed one such man. Another was a Civil Engineer; and another was an eminent man in his way, but not a professional man. Still, there were those three men sufficiently qualified. They served for a few years; and then it was felt it was not right that the Engineer of one of the London Gas Companies (Mr. Evans) should be a Referee, and he retired. From that time the gas industry of London has been placed under the domination of University Professors. Not one of them complies with the condition that he shall be "a man of practical knowledge and experience in the manufacture and distribution of gas." We deal with thousands of tons of coal. Some days in the winter we are using over 5000 tons. It is a rough-and-ready sort of work; and we employ rough labour. The coal is put into the retorts; and although we cannot always get the same quality of coal, we are expected to make gas of such exact quality as they would make if they were using an ounce of coal, instead of thousands of tons. We have been under the domination of these gentlemen; and I am prepared to say—for I had it myself before I retired from the office—that there is nothing which causes the engineer and manager so much anxiety and worry as this gas testing. They all bear testimony to it. Here is something in the report about it—the little paragraph at the bottom, where the Auditor says: "I certify that the above accounts are correct. A forfeiture incurred during the half year, amounting to £5, must be borne and paid exclusively by, and out of, the divisible profits of the Company, and by way of reduction of dividend." Well, that was on two days; there was a slight excess of sulphur. The Referees have passed regulations that the sulphur is to be limited to 17 grains in the summer; and on one day it was ⅓ grain in excess, and on another ⅔ grain. The London County Council summoned us before the Magistrate; we are reported in the newspapers for having supplied impure gas; and there is a penalty of £5 to be deducted from the dividend. We shall not deduct it from the dividend; there are ways and means of meeting it without troubling anybody. The worst of it is that it takes the attention of the Engineers from their proper work, and it does not do an atom of good to the public. They are not a bit better for all this fuss and testing. All we ask is that this great industry should be freed from these hampering restrictions. If people do not like gas, they can burn oil or have acetylene or the Kitson light, or the electric light. We feel that we are justified in asking Parliament to relieve us from this intolerable restriction. I was told by the Engineer of the Commercial Company that it worried one of his foremen so much that it shortened his life; and I believe it shortened my brother's life. I tell our Engineers not to worry about it—let the thing go; but they cannot do so. Therefore, we say the time has come when this great industry should be freed from the domination of University Professors, who know nothing about it. Whether we shall succeed or not, I do not know; but we will try. The next question is as to the Directors' fees. That is rather a delicate matter; and it is best that I should be perfectly frank, and not allow feelings of false delicacy to interfere. In 1888, we amalgamated with the Phœnix and Surrey Consumers' Gas Companies; and the fees that were then paid were fixed at £3500 a year—the number of Directors being seven. This gives an average of £500 each. The Chairman gets an extra £100, which brings his share up to a little under £600; and the others received about £480. In 1880, we were selling about 3500 million cubic feet of gas; we are now selling three times as much as that, the business having increased three or four fold. If that was all, we would say nothing about it; but the condition of things has seriously changed. In the old days, any business man having the necessary qualification would do for a gas director; but it is not so now. The position is far more onerous and difficult. We want the best men available, and we cannot get them. My friend Mr. Ewart will bear me out when I say that we visited some of the ablest men in the city; and we could not get them to join the Board—not that we have not got good men for all that. There is another point—namely, the question of a Chairman. In the practice hitherto followed, it has been for good business men to be elected as Directors, and for them to choose from among their number a man to occupy the chair. This was all very well when the thing was small. Now it will not do. When you have to find a successor to me, you will have to get the best man you can meet with anywhere—one who is an expert in the business; and you will have to pay him well. It is not at all satisfactory to have an old man as Chairman. You want a man in the prime of life, and a man thoroughly versed in all matters connected with gas supply; and you will have to pay him not less than £2000 a year. I look to the time, if it should please God to spare me a few years longer, when I shall vacate this chair, and see my successor appointed; and then I hope it will be such a man as I have described. One reason why the Directors ask for sanction to increase the fees is that when the time arrives they may have a margin in order to provide for the Chairman. They say that, as far as they are concerned, £500 or £600 is enough. We shall not take the full amount allowed; but we ask that the amount may be increased from £3500 to £5000, and, as the business increases, to £5500 and to £6000 as a maximum. If the Bill passes, the fees which the Directors may take will amount to £5000 a year. I think I am justified in saying that they will not take that, or anything like it. They will take a small increase, and leave the balance in order to provide for a possible change of Chairman. Why I say this about the Chairman, is because I have had experience in both positions. You must either have as your Chairman a man who thoroughly understands the business, or the Company must be controlled by one or other of the chief officers. For about ten years, I was chief officer of the Company. I knew the business better than any of the Directors; and I practically controlled it, which was unsatisfactory to me and to them. It is far better for the head to be the Chairman, to whom the officers may look up as one who can take the general direction. This remark does not apply to our Company alone. I consider it one of the greatest weaknesses in joint-stock companies that the direction is so commonly incompetent—that they have not the best man for the position, as our friends across the Atlantic have. That is the justification for asking for an increase in the Directors' fees. I need not take up your time by referring to the other matters which we shall put before Parliament. I now beg to move the resolution which I have already read.

Mr. SIMPSON ROSTRON seconded the motion.

Mr. HOWLETT, in supporting it, said that in Greater London it was necessary they should take up land while they could get it, rather than wait and have to pull down acres of houses. It was true they had more than enough land for fifteen years, and it might be said: "Why should we do anything for posterity; they have never done anything for us?" This was a very low view to take of public life. They had constantly to do it in municipal affairs; and it was absolutely necessary to do it in

a business of this sort. With regard to the point as to gas testing, no doubt this matter had been in a very unsatisfactory state for a good many years. Even to-day a good deal might be done if the Government were to employ real experts instead of such gentlemen as had been appointed. If this had been so, things would have turned out very different. However, that was a matter with which Parliament would have to deal; and he had not much doubt that the Chairman's eloquence would guide the Committee in the right direction. Dealing with the third point—the Directors' fees—he said the Company had been peculiarly fortunate in its Chairmen. The Chairman had devoted his energies to the Company for the past fifteen or sixteen years—in fact, had he retired at the time and have gone the way of all great gas engineers, he might have been earning some £10,000 a year. Instead of which, he had devoted his services to the Company for the paltry sum of £600 a year. Although the Chairman had stated that he hoped to see his successor appointed, he (Mr. Howlett) was sure the shareholders wished that day would be a long way ahead. So long as George Livesey chose to take the chair of the Company, there was not a man inside that building, or out of it, who would have the slightest desire to see a new Chairman. In the manufacture of gas, it was necessary to have engineers, and to pay them large salaries; it was equally important that the Chairman should be paid a proper salary, more especially considering the splendid position to which he had brought the Company.

The resolution was put, and carried unanimously.

The CHAIRMAN said that if there had been one dissentient vote, they would have had to have a poll. He was very much obliged to the shareholders for their unanimity.

Mr. HOUNSON said he had been waiting for someone to propose a hearty vote of thanks to the Chairman and Board of Directors for their services during the past year; but he supposed that diffidence arose from everybody expecting somebody else to do it. The difficulties connected with gas industries were very considerable; and they had the satisfaction in this Company of having a great expert at its head, backed up by those who knew their work. They had had a marvellous record in the past, and he had little doubt that the record would be as brilliant in the future.

Mr. H. E. JONES seconded the resolution, which was put and carried unanimously.

The CHAIRMAN, on behalf of his colleagues and himself, thanked the shareholders for the hearty manner in which the vote had been received. He could only say that it was one of the most pleasant episodes of life to come to these meetings. He could promise them that he would not stay in that position when he felt his powers failing, or when unable to fulfil the duty of the post; and he hoped to find a successor to do the work at least as well as himself. On behalf of his colleagues, he could say that they were a body of men devoted to the interest of the Company, and no body of men had worked more cordially or loyally together—not merely the ordinary Directors, but the employee Directors also. They all worked for the benefit of the Company, and the weekly meetings were pleasant ones. But, still, they had a great deal of anxious work to do. He begged to propose a vote of thanks to the officers and employees generally. He could not speak too highly of the devotion of the officers—taking Mr. Carpenter as representing the engineers and manufacturing staff, and Mr. Bush as representing the official and clerical staff. Both were able men; and they were well supported by the engineers, the foremen, and the workmen. The spirit which had been shown by Mr. Drumgold in his remarks animated all the assistants; and the future was a bright one. The cordial spirit of goodwill had animated everyone; and there, he thought, they had an advantage in these difficult and anxious times.

Mr. MORTON said he had much pleasure in seconding the resolution, which was carried unanimously.

Mr. C. C. CARPENTER said, on behalf of the engineering staft, he thanked the proprietors for their kind vote. He need not say that it was sincerely appreciated. As the Chairman had said, the burden on one's shoulders in connection with the mechanical side did not get less as years went on; but it was rendered light by the knowledge that the whole of the staff were working harmoniously, and were pulling in one direction—their sole aim was to forward the Company's interests.

Mr. FRANK BUSH thanked them most heartily and sincerely for the vote of thanks to the officers and the workmen. In paragraph 3 of the report, mention was made of the number of slot meters that the Company had in use—rather over 123,000. He thought it might be of interest to the proprietors to know that during the half year the 90 collectors—all being their own workpeople—had taken from these meters 39,310,000 pennies, which amounted in the half year to £163,793. The biggest week's taking was £9782. One of the shareholders had observed a somewhat large increase that had taken place in bad debts, and had drawn attention to it; but it was not as bad as it appeared. One would think the bad debts had gone up £1300 in the half year. For some years, in fact, the bad debts had been from 6s. to 7s. per cent. of rental, and they suddenly jumped up to nearly 10s.; the total amount being £3276. Of that £3276, at least £800 had been brought forward from previous half years; and the Directors had adopted a "clean slate theory," and wiped them off. It was not so bad as it appeared on paper. The collectors had strict orders not to cut off the gas unless it was absolutely necessary. When he stated that only 93 consumers were cut off for the quarter ending Christmas, and that they had over 100,000 customers, it did not amount to 1 in 1000. It meant that the collectors had cut off three consumers in each district. That showed the Company did not use their powers harshly.

Main-Layers Nearly Asphyxiated at Sheffield.—Last Tuesday three men from the Grimesthorpe Gas-Works, Sheffield, tapped a 12-inch main in order to put in communications to two shops. While opening the main they must have inhaled a large quantity of the gas; for on leaving their work, at about 4.30, it was noticed that two of the men were staggering. A police-constable saw the men in this condition, and on learning what was the probable cause, a cab was obtained and they were taken to the police station, and attended by the police surgeon, who endeavoured to revive them. Eventually, however, they had to be removed to the Infirmary in the ambulance. There the men soon recovered consciousness, and were discharged the following day.

SHEFFIELD UNITED GASLIGHT COMPANY.

Half-Yearly Report and Accounts.

The report and accounts of the above-named Company for the six months ending Dec. 31 have been issued for presentation at the half-yearly general meeting on the 10th prox. In their report, the Directors announce that there was a falling off to the extent of £3953 in the receipts for gas sold in the above-named period, due to the reduction of 2d. per 1900 cubic feet in the price, which came into force on the 1st of October; but there was an increase of 36,341,000 cubic feet, or 2·62 per cent., in the quantity sold. Considering the state of trade in the city, the Directors regard this as undoubtedly satisfactory. The profit on the half-year's working is sufficient to pay the usual dividends, and leave £3467 to be added to the balance carried forward at the close of the past half year In order to further encourage the use of gas-engines, the Board have decided to supply gas for actuating them at 1s. 8d. per 1000 cubic feet, in cases where the consumption amounts to £10 worth and upwards per annum. The Directors believe that at this price gas will be found to be a most economical and advantageous means of obtaining motive power for many of the industries of the city. It should also assist in reducing the quantity of smoke at present discharged into the atmosphere, and lessen the trouble manufacturers are put to in complying with the requirements of the smoke inspectors. The accounts accompanying the report show that the sale of gas produced £139,968; meter and stove rentals, £6939; and residuals, £52,926—the total revenue being £201,995. The following are the chief items of expenditure: Manufacture, £191,069 (coals costing £71,585); distribution, £16,075; rents, rates, and taxes, £11,490; and management, £5565—the total being £155,766, and the balance carried to the profit and loss account £46,229. The statements relating to working show that 131,522 tons of coal and 13,995 tons of cannel were carbonized in the past half year; the residuals produced being as follows: Coke and breeze, 88,849 tons; tar, 7830 tons; and ammoniacal liquor, 4,650,700 gallons.

SWINDON GAS SUPPLY.

Swindon United Gas Bill Sanctioned.

The shareholders of the New Swindon Gas Company met on Thursday to pass the usual statutory resolution of approval of the above-named Bill, the provisions of which were explained by the Solicitor. It consists of 52 clauses, and empowers the New Swindon Gas Company to purchase the Swindon Gas and Coke Company; the New Amalgamated Company to be called the Swindon United Gas Company. The shareholders of the old Company are to be bought out at par; receiving consolidated stock in the new Company. A clause repeals the Provisional Order of the old Company, and certain of its Directors are to receive £40 each as compensation for loss of office. There is also a provision for the payment to Mr. H. C. Shepherd, the Secretary and Manager of the old Company, of £400, if he should be employed by the purchasing Company at the time of the transfer, and should he be dismissed at any time within two years of the date thereof. With regard to the Directors of the new Company, it is laid down that there shall be not less than four and not more than eleven; and the qualification is to be the possession of £500 of consolidated ordinary stock. The Bill extends the Company's limits so as to include the outlying parishes of Stratton St. Margaret, Rodbourne Cheney, and Wroughton; and a clause is included which will empower the Company to supply gas in bulk to bodies outside their district. The Chairman of the Directors congratulated the shareholders on the fact that an amicable agreement had been arrived at with the Town Clerk on behalf of the Swindon Corporation on certain matters of detail, so that the Bill would be unopposed. The Bill was approved.

CHARD CORPORATION AND THE GAS COMPANY.

An interesting contribution to the discussion between the Chard Corporation and the Gas Company, respecting the Company's application for parlimentary powers, was made at a recent meeting of the Town Council. It was in the form of a bond, entered into in 1889, between Messrs. H. F. Willey and T. Stone, who at that time became possessed of the gas-works, and Mr. W. J. Tucker, the Town Clerk of Chard. It appears from the deed that the Chard Gas and Coke Company, Limited, was registered in January, 1870, and that in July, 1879, they leased the works to Messrs. Willey and Stone for 14 years; finally agreeing, in 1889, to sell the works and plant to these gentlemen. The Company appear, however, to have considered themselves as "trustees for the Corporation of Chard and for the inhabitants thereof," and, as a condition of the transfer, insisted upon the purchasers entering into an undertaking not to raise the price of gas above the then prevailing rates. In accordance with this stipulation, the document now referred to binds Messrs. Willey and Stone, "their successors, heirs, and assigns, or other persons or person, hereafter owning or being the proprietors of the gas-works," to supply to "the town of Chard and the inhabitants thereof, so far as the present mains extend, gas of good and sufficient quality and quantity" at prices which it sets out. The public lamps were to continue to be supplied at a sum not exceeding £2 17s. 4d. per lamp, under the conditions of the then existing contract; and private consumers at 4s. 2d. per 1000 cubic feet (the price then charged), "unless and until in either of the above cases the price of coal suitable for the making of gas shall exceed £1 per ton at either of the Chard railway stations, as provided by the lease hereinbefore referred to; then the above-written bond or obligation shall be void, or else to remain in full force and virtue." The penalty for breach of the conditions was to be £800. In the course of some discussion with regard to the bond, Mr. J. Hawker expressed the opinion that it would greatly strengthen the hands of the Council in the course they were pursuing. Mr. R. Dwelly agreed that it was a document of considerable importance, but he hoped the Parliamentary Committee would do all they could to meet the shareholders of the Company. It was decided to refer the document to the Parliamentary Committee.

CRYSTAL PALACE DISTRICT GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held last Friday, at the Albion Tavern, Aldersgate Street, E.C.—Mr. GEORGE LIVESEY in the chair.

The SECRETARY (Mr. Charles M. Ohren) read the notice convening the meeting; and the Directors' report and the accounts, which were summarized in the "JOURNAL" for the 4th inst., were taken as read.

The CHAIRMAN said he was very pleased to see such a large meeting, as it showed the interest of the proprietors in the affairs of the Company. In moving the adoption of the report, he might in the first place say that the half year to some extent had been an uneventful one; and there was not much to be said on the report. The most important matter was in the first paragraph, and that had reference to the reduction of 3d. per 1000 cubic feet in the price of gas from Midsummer. In consequence of the high cost of coal the year previously, the Directors were under the necessity—a necessity greatly regretted by them—of raising the price of gas to the consumers. The Board had to bow to this unfortunate circumstance; and there was really no help for it. They therefore increased the price 4d.; and last June they took off 3d. of the 4d. The Directors fully expected they would have had a sufficient balance to have paid nearly the full dividend to which the proprietors were entitled at the present price of 2s. 7d. That was to say, the proprietors were now entitled to 5⅜ per cent.; and the Directors believed that they would be in the position to recommend 5¼ per cent., but they had been disappointed. Concurrently with the reduction in the price of coal which warranted the reduction in the price of gas, there was a fall in the value of coke. He might say the reduction in the price of coal amounted to about 4s. 9d per ton. In the half year to December, 1900, coal cost them 20s. 5d. per ton; and in the six months to December last, 15s. 8d. per ton delivered. This was a reduction of 4s. 9d.; but more than all went in two items. The reduction in the price of gas took away 2s. 6d., and the fall in the value of coke 3s. per ton of coal carbonized. In the past half year, they only received for coke what was equivalent to 6s. per ton of coal used; whereas in the corresponding half of 1900 they realized 9s. a ton. Thus the loss on coke of 3s. and the reduction on gas of 2s. 6d. amounted together to 5s. 6d. But they only saved 4s. 9d. on the coal; so that they were 9d. to the bad on these items alone. The result was that, instead of having a surplus, they had a deficiency. It had always been the practice of the Directors to be perfectly frank with the proprietors, and not to gloss over anything; and they had found this to be the best policy. There was a deficiency on the half-year's working of nearly £3000; and they brought forward from the preceding half year £2596. Therefore, the deficiency on the net revenue account only amounted to a few hundreds, which, if necessary, would have to be taken from the reserve fund. They expected that the present half year would yield a surplus, and that the necessity of taking anything from the reserve fund would not arise. At any rate, it would only be to the extent of a few hundred pounds; and the reserve fund was in a very healthy condition. It now amounted to £37,476, so that there need be no apprehension on that score. Now a few words about this reduction in price. He thought he might claim something for gas companies as being unique as traders. Not merely this Company, but speaking of gas companies generally, it was their object, and the continuous effort of directors and managers to constantly sell gas at the lowest possible price. There was a common business axiom about buying in the cheapest market and selling in the dearest. Gas companies, however, did not sell in the dearest market; but they tried to sell their gas at the lowest price at which they could make it. And he claimed to the credit of gas companies that in this sense they were benefactors—not merely servants of the public, but benefactors. He did not claim any other further credit for them. Taking a broad view, it was to the interest of gas companies to sell gas cheaply; and it would be found that those companies who had followed this policy most thoroughly were the most successful and prosperous among gas companies. Therefore, their interest being identical with that of the consumers, they were pulling together so far as that was concerned. He should like to say about the sale of gas, that there was a common impression abroad that gas companies were anxious for consumers to burn as much gas as possible. This was quite true; the companies were very glad indeed to find their consumption increasing. But while this was so, the sense in which the statement was made outside was not true. The companies were most desirous that the consumers should get the greatest possible effect out of the gas—that they should use such appliances and such burners as would develop the utmost possible advantage from the gas used. It seemed to be a general impression that they were glad if the consumer used a bad burner. When he said a "bad" burner, he meant an extravagant one—one by which, in order to get a certain amount of light, the consumer had to use twice as much gas as would be required with a better burner. This was a total fallacy. What the gas companies were anxious for was that the burners, the gas-stoves, and the gas-fires that their consumers used should be the most effective that could possibly be obtained. He was quite sure this was the spirit that animated their Engineer. If anybody brought a new stove to him, the first thing he did was to try its effectiveness; and if it was an extravagant stove, he would tell the makers that it would not do for him. There, again, he (the Chairman) was not going to say there was no self-interest in it. It was, he claimed, an enlightened self-interest. If they could supply gas in such a way that it would be to the advantage of the public to use it, it re-acted to the Company's advantage; and therefore his contention was that, in selling gas cheap, and in doing what they could to teach and to enable the consumers to use the gas economically, they were benefiting both the consumers and themselves. This, in fact, was the ideal of trading, to "bless him who gives and him who takes." While on this point he might touch on another subject as to the effectiveness of the lighting power of gas. There were a number of burners in use now that did not give the consumers more than 1 to 2 candle power per cubic foot of gas consumed per hour. Say, 3 candles per foot of gas was about as much as they could get from the best ordinary burner; but the Welsbach system had put this completely into the shade. Instead of getting 3 candles per cubic foot of gas, by the incandescent mantle they could get 12 and perhaps 20 candles per cubic foot of gas—in fact, he did not know what they could not get by means of this system. The lighting power was increased enormously. To give an illustration. While speaking to a friend in the City the other day, his friend mentioned that he had put three Welsbach burners into one of his offices in place of eight common burners. He (the Chairman) said, "Well, then, with these three burners you are using about 12 cubic feet of gas per hour, while with the eight burners you previously had you were burning 40 cubic feet per hour; and yet you are probably getting twice or three times as much light from the three as you were previously obtaining from the eight, although using one-third the quantity of the gas." Well some people would say: "Then the companies must be losing if the consumers are burning less gas." To an extent it was so; but the consumers got more light, and this made gas more popular. It became used where it would not have been otherwise. It enabled gas to meet all competition; and there was really nothing to compare with it as it was used with the Welsbach mantle. Therefore, the future for gas seemed to be perfectly assured, because, although the electric light might be used in some cases, as for public lighting, gas was better and cheaper, and it would in the end prevail. Those who were infatuated, over the new system of lighting could not resist the superiority of gas, if it was, as he was sure it was, superior in regard to price and lighting value. This brought him to another point. There had been something very unsatisfactory about the Welsbach system. He need not say a word against the Welsbach Company itself; but users of the mantles were in a position of great uncertainty at the p esent time. On the Continent, there were no patents in incandescent mantles; they had all expired. In England, the original patent, taken out in 1886, expired in 1890. In 1893, the Welsbach Company took out a new patent; and it might run on to 1907. It was contended by some people that this patent was not a valid one; but it was not for him to give an opinion one way or the other. At any rate, that was the opinion of some people; and the Welsbach Company were claiming injunctions of all sorts on small traders who sold mantles which were said to be infringements of the 1893 patent. It was highly important for the gas industry that this matter should be settled. The uncertainty was bad for everybody. The Welsbach people had refrained from bringing the question to an issue. There were certain people who made mantles in this country; and the Welsbach Company knew it. They had entered actions against them; and the proceedings had been stayed—at all events, they had been held over since 1900. Consequently, the whole trade was in an uncertain and unsettled condition. There was reason to believe that very shortly an action would be brought to trial; and it was highly important that it should, and it ought to be, properly defended. It would never do to allow such an important matter to go by default. Therefore he thought it was necessary the gas companies should take some action in the matter, in order to ensure a proper defence. A guarantee fund had been started. But only three Companies had been spoken to at present—practically there were four. The South Metropolitan Company started the fund; the Commercial Company agreed to subscribe to it; and that day the Board of their own Company agreed to subscribe £300 towards it. A letter would be addressed to the different gas companies and corporations, asking them to support this fund, in order to get together a guarantee of £10,000 to £20,000. If they got £20,000 guaranteed, there would be a smaller call on the contributors than if they had only £10,000. If the action were lost, they would at any rate know where they were; and if it was won, of which there was a fair chance, they would get mantles at a cheap rate, and the system of incandescent lighting would go like wild-fire. On the suggestion of their Engineer, they had adopted a system of maintaining incandescent burners for their customers. They had not yet actually got it started; but what Mr. Shoubridge had proposed, and what they were going to try was this: For 3d. per burner per quarter, they would undertake to keep a burner in order; and the consumer would have to pay, in addition, for such mantles as might be required. The system had been carried out by other companies in a different way. For an inclusive payment of (say) 9d. per quarter, they kept the burners in order and provided the mantles. The objection to this system was that it gave the consumer no inducement to be careful with the mantles; and so in their Company they were going to try, on Mr. Shoubridge's initiative, the other line. For the 3d. per quarter, a man would be sent round periodically to examine and clean the burners, and replace such mantles as required renewing—the consumer paying for the latter. The Company would then be able to ascertain which was the better system. He was satisfied that gas suppliers were the people to undertake this work; and if they would only turn their attention to it, they would be rendering a great service to the consumers, and would be doing something towards maintaining their own position. He had already made a remark about the dividend. It was 5 per cent. The Directors would have been glad indeed to have recommended 5¼ per cent.; but they must ask the proprietors to exercise a little more patience—such patience as they had shown in the past, and which the Board highly appreciated. He could thoroughly endorse the statement in the report that the working of the Company was satisfactory, as well as that which said "the officers and workmen are doing their duty in a cheerful spirit of loyalty to the Company." In connection with this, there was one little fact which he should like to mention. The Directors and men had recently started a mutual accident fund. The trade unions did not like this sort of thing. It was what was known as contracting out of the Compensation Act. The Board thought it better to deal with their workmen direct, and to give them a definite allowance per week without the uncertainty of law, and in the case of a fatal accident to a man, to give a weekly allowance to his widow. Each workman was to contribute 2d. per month, and the Company 4d. per month per man, and the latter also guaranteed to make up any deficiency. Experience in another Company showed that this was about enough to meet the charges. Before this was arranged, a meeting of the men was called, and he addressed them; and the way they took the matter up was exceedingly gratifying—there was absolute

unanimity—every man becoming a subscriber. He mentioned this as an instance of the friendly feeling that existed between the Directors, officers, and their workmen. With these remarks, he moved the adoption of the report and accounts.

Mr. JABEZ LIGHT seconded the motion.

Mr. G. T. POWELL expressed his gratification with the report, and also with the unanimity with which the men had accepted the mutual accident fund. He agreed that it was much better that any case of accident should be met in this way than by going to law. As a newcomer to the meetings, he also sought a little information regarding the accounts.

The motion was carried unanimously.

Proposed by Mr. ROBERT MORTON, seconded by Mr. BRYAN DONKIN, a dividend at the rate of 5 per cent. was declared on both the preference and ordinary stocks.

The CHAIRMAN then moved the re-election of Mr. C. Lea Wilson, one of the outgoing Directors.

Mr. H. E. JONES, in seconding the motion, remarked that the name of Mr. C. Lea Wilson had been for many years a "household word" with the Crystal Palace Gas Company. He (Mr. Jones) remembered applying for the post of Engineer of the Company, when the then Chairman told him he was a beardless boy, and Mr. Lea Wilson was on the Board at that time. He had served the Company well; and he hoped to see him unanimously re-elected that day. While speaking, he should like to say with what pleasure he had heard that the Company had decided to adopt a system of maintaining incandescent burners. He was one of those who believed that the Welsbach invention, in spite of the many abuses that had surrounded the administration of the Company's operations, had been a magnificent and a marvellous thing for gas. Gas companies were realizing now that it was necessary to help the consumers whom they had all too long held at arm's length. Look, said Mr. Jones, at the beastly things called gas-fittings. Could anything be more ugly? But gas companies had never troubled to give the consumers pretty fittings. The electricians had been wiser than the gas people in this respect, and put pretty electric pendants into rooms. In his opinion, one of the best things about the electric light was its appendages. In regard to the maintenance of incandescent burners, he hoped the Company would succeed; but he did not think they were going far enough. There were gas companies whom he had advised who would not go the length of putting in coin-meter fittings, and would only fix the meter. This simply paralyzed the whole thing. In one of his Companies, some time since they circularized the whole of the houses under £30 rental, offering to supply people with gas-fittings on the hire system, and reducing the rental on the meters to about half, In return, they only got about thirty consumers; but directly the coin meter came into vogue, the whole thing went like the wind, and they had never been able to catch it up. He could not help thinking that, in this maintenance of the incandescent burners, the Company should go a little step farther, and take the risk of replacing the mantles. They would put the consumers into the position of knowing once and for all what it would cost them. He strongly upheld the idea put forward by the Chairman in regard to the Welsbach patent. He admired the invention; but it was high time they knew exactly where they were on the subject. A man brought into his office the other day a burner, chimney, mantle, and stalk for 8d.; and he (Mr. Jones) at once bought four. If they could buy at this price, they would be able to put these things into any workman's house. He did not want to become liable in respect of maintenance and barratry; but he would cheerfully give £100 out of his own pocket to have this patent question settled. He did not want to do anything unfair to the Welsbach Company. But what he said was, if they had a patent, by all means let it be proved by the law. He referred to the "curious methods" of the Welsbach Company, and also to the prices charged for their goods in connection with the public lighting of a large colonial city, and which prices caused the public lighting of the city to be continued at a much higher figure than it need be. He did not want to do any injustice to the Company, nor to bully them, but he did want to find out where they were. It was proclaimed abroad that the South Metropolitan Company were using a cheaper mantle than the Welsbach. Then why did not the Welsbach Company fight them, and settle the matter. He hoped that when the fight did come that it would be fought in the best of temper. As the Chairman had stated, a Company with which he (Mr. Jones) was connected were going to contribute to the guarantee fund.

The motion was unanimously carried.

The CHAIRMAN next moved the re-election of Mr. Bryan Donkin to the Board. Mr. Donkin, he remarked, had a world-wide reputation as one of our ablest scientific engineers.

Mr. POWELL seconded the motion, and it was also unanimously passed.

Mr. C. LEA WILSON having responded,

Mr. BRYAN DONKIN also acknowledged the confidence of the proprietors. In doing so, he made a few remarks on the subject of power gas and gas-engines, in which direction he thought there was a considerable future for gas companies, especially those companies who were surrounded by factories, works, and shops requiring power. The point he wished to emphasize was the production of cheap gas and its utilization for power purposes. This, of course, would require a cheaper gas than lighting gas. Many companies now made water gas; and he thought this gas could be delivered, non-carburetted, for power purposes, to manufacturers situated near the gas-works. He thought that, if manufacturers could get power cheaply from gas-works in this way, it would draw new and large customers, and bring them near the works. His ideal of a gas-works in the future would be one which supplied gas for lighting, cooking, heating, and small power purposes over a large area, and then power gas around the gas-works for driving large gas-engines. If gas undertakings did not supply power gas in the future, then the large manufacturer would put in his own gas producer plant. He quite agreed with what Mr. Dugald Clerk had said, that the Twentieth Century would be that of the gas-engine just as the Nineteenth Century saw the great development of steam.

On the motion of Mr. Thomas GUYATT, seconded by Mr. JONES, the retiring Auditor (Mr. Samuel Wood) was re-appointed.

The CHAIRMAN next proposed that the remuneration of the Secretary be increased by £100 per annum from Jan. 1 last. In Mr. Ohren, he observed, they had a devoted officer, who was doing his very best in the service of the Company.

Mr. ROBERT MORTON seconded the proposition; and it was heartily agreed to.

Mr. OHREN, in acknowledging the vote, said he felt very deeply the kind terms in which the Chairman had put the motion to the meeting, and the hearty and unanimous way in which it was carried. He expressed his thanks to both the Directors and the proprietors for their kind consideration, which, he assured them, was highly valued.

Mr. JONES moved, and Mr. SAMUEL WHILE seconded, a cordial vote of thanks to the Chairman and Directors; and this was also unanimously passed.

The CHAIRMAN, in responding, referred to two points raised during the election of the Directors. First, he said that personally he believed in making an exclusive charge for the maintenance of incandescent burners and mantles. Theoretically this was not quite correct; but he thought it was the best way. They were, however, going to give the plan proposed by Mr. Shoubridge a trial, so as to find out which was really the preferable system. If Mr. Shoubridge found it was not the more satisfactory, he would soon adopt the inclusive charge. In regard to Mr. Donkin's remarks, his own view was that what gas suppliers would have to come to would be, instead of a dual supply, to make a gas which would be suitable for both lighting and power. When they had 80 or 90 per cent. of their consumers using incandescent burners, they would be able to say to the other 10 per cent. that they could not go on making expensive gas for them alone, and that they would have to fall in line with incandescent mantle users.

A hearty vote of thanks was then passed to the Engineer, Secretary, staff, and the general body of workmen; and after an acknowledgment by Mr. SHOUBRIDGE, the proceedings terminated.

PROVINCIAL GAS AND WATER COMPANIES.

We continue to-day our usual reports of the meetings of Gas and Water Companies in different parts of the kingdom.

GAS COMPANIES.

Bury St. Edmunds.

The 105th half-yearly meeting of the Bury St. Edmunds Gas Company was held on Friday—Mr. J. Floyd presiding. The Chairman stated that £250 less had been spent upon coals than in the corresponding half of the previous year; but rates had amounted to £30 more. To the profit and loss account £1476 had been carried, or £248 less than in the preceding year. They had received £240 less for gas, there having been a reduction of 3d. per 1000 cubic feet in the price; and there had been a smaller return than usual from residuals. There was, however, some hope that these things would be rectified during the present year. Dividends were declared at the rates of 10s. per share on the 1849 capital, 7s. 6d. per share on the 1859 capital, and 7s. per share on the 1879 capital—all free of income-tax.

Colney Hatch.

The report to be presented at the half-yearly meeting of the Colney Hatch Gas Company next Thursday, states that there has been an increase of 8·38 per cent. in the amount of gas sold during the six months ending Dec. 31, as compared with the corresponding period of the previous year. The cost of coal and other carbonizing materials shows an improvement; but this gain has been more than counterbalanced by the falling off in the value of residuals. It has become necessary to provide increased storage accommodation, to meet the growing demand for gas; and this work will be at once proceeded with. The Directors recommend the payment of dividends for the half year at the rates of 10, 7, and 5 per cent. per annum on the various classes of stocks and shares, which will leave a balance of £1970 to be carried forward. The receipts for the six months amounted to £9931; while the expenditure was £7966. The capital outlay since June 30 last has been £1225; leaving a balance of £4612 to the credit of this account. The reserve fund amounts to £7724. There were carbonized or used during the half year 3379 tons of common coal and 27,750 gallons of enriching oil.

Ipswich.

In the report which the Directors of the Ipswich Gas Company presented at the ordinary general meeting yesterday, they recorded with much sorrow the death of their late Chairman and colleague, Mr. George A. Biddell, who for eighteen years "served the Company wisely and well." He entered very thoroughly and fully into the management of the undertaking, and was ever ready to help with his valuable experience and advice. Mr. D. Ford Goddard, M.P., fills the position rendered vacant by Mr. Biddell's death. Turning to the affairs of the Company, the accounts presented showed that the sale of gas and the rental of meters and stoves produced last year a sum of £46,988; the returns from residuals were £19,126; and the total income was £66,275. The items of expenditure included the following: Manufacture, £44,400 (of which £30,822 was for coals); distribution, £3947; rent, rates, and taxes, £2579; and management, £1973—the total being £55,640. The balance carried to the profit and loss account was £10,635; and the sum available for distribution, £12,783. An interim dividend was paid in September; and the Directors recommended a further dividend to make up the full statutory rates of 12, 9½, and 9 per cent. per annum on the three classes of stock. After payment of these, a balance of £7641 would remain to be carried forward. Under the supervision of Mr. J. T. Jolliffe, 33,547 tons of coal were carbonized; the residual products being: Coke, 20,129 tons; breeze, 1687 tons; tar, 360,648 gallons; and sulphate of ammonia, 304 tons. There was an increase of 7·58 per cent. in the quantity of gas sold last year.

Newmarket.

At the meeting of the Newmarket Gas Company yesterday, the accounts presented showed a revenue of £14,101 for the past year, against which there was an expenditure of £10, ; leaving a balance

of £3558 to go to the profit and loss account. There was a sum of £4124 available for distribution; and the Directors recommended a dividend at the rate of 6 per cent. for the first, and of 6½ per cent. for the second half of the year—making an average of 6¼ per cent.—less income-tax. This would absorb £3531, and leave a balance of £593. Under the supervision of Mr. J. H. Troughton, the Manager and Secretary, 5360 tons of coal were carbonized last year. The production of gas is not stated in the accounts; but the Directors reported that the quantity sold was larger than ever before. The works and plant have been considerably improved during the year.

Scarborough.

At the half-yearly general meeting of the Scarborough Gas Company last Saturday, the accounts presented showed that the sale of gas to private consumers in the six months ending Dec. 31 produced a net revenue of £20,498; the returns from residuals were £4552; and the total receipts were £28,804. With regard to expenditure, the manufacture of gas cost £15,717; distribution, £1849; and management, £976—the total being £20,466. There was consequently a sum of £8338 to go to the net revenue account, the balance of which was £7413. The Directors recommended the payment of the maximum dividends, which would leave a surplus of £825. There was a satisfactory increase in the Company's business during the half year; the total quantity of gas sold being 159,925,000 cubic feet, or 4·9 per cent. more than in the latter half of 1900. The manufacturing operations of the Company, which are now under the supervision of Mr. Alexander Allan, who succeeded Mr. John Holliday as Manager and Secretary, were conducted with the usual regularity during the half year. The quantity of coal and cannel carbonized was 11,224 tons; and there were used in addition 127,876 gallons of oil. The residuals produced were: Coke and breeze, 6734 tons; tar, 825 tons; ammoniacal liquor, 854 tons. The new sulphate of ammonia and Claus sulphur-recovery plants were at work during the half year with satisfactory results.

Spennymoor and Tudhoe.

The shareholders of the Spennymoor and Tudhoe Gas Company held their annual meeting on Wednesday week—Mr. John Crawford presiding. The Directors' report stated that the balance available was £1866, out of which a dividend was recommended at the rate of 5 per cent. on the original capital and 3½ per cent. on the additional capital, for the half year ended Dec. 31 last; making, with the interim dividend, a total for the year of 10 per cent. on the original, and 7 per cent. on the additional capital, and leaving a balance of £716 to be carried to next year's accounts. The report was adopted.

Shanklin.

The accounts presented at the annual general meeting of the Shanklin Gas Company, Limited, showed that the public and private lighting produced a revenue of £4268, and the sale of residuals £1103; the total receipts being £5794. The expenditure being £4416, the balance carried to the profit and loss account was £1378. The sum available for distribution was £2300, and the Directors recommended the declaration of dividends (less income-tax) of 10 and 7 per cent. on the original and new shares. The recommendation was agreed to. The installation of regenerative firing throughout the retort-house will be completed during the year.

Willenhall.

The shareholders of the Willenhall Gas Company are to be congratulated upon the results of the past half-year's working; the Chairman (Mr. C. Tildesley) stating at the recent meeting that the full dividends had been earned, notwithstanding the high price of coal and the low returns from coke and other residual products. The report was adopted; and the statutory dividends were declared.

Yeadon and Guiseley.

The half-yearly meeting of the Yeadon and Guiseley Gas Company was held on Wednesday—Mr. King (the Chairman) presiding. The Directors reported a decreased consumption in gas of 5¾ per cent. Nine months' contracts for coal had been entered into at a little over 3s. per ton below last year's prices; but, unfortunately, coke had had to be reduced by 4s. 2d. per ton. The price of gas had also been lowered 1d. per 1000 cubic feet, and the Directors had it under consideration to make a still further reduction. The report was adopted, and the usual dividends of 10 and 7 per cent. per annum were declared.

WATER COMPANIES.

Colne Valley.

The report presented to the shareholders at the half-yearly meeting of the Colne Valley Water Company last Tuesday stated that the total capital expenditure during the six months to Dec. 31 was £12,603, of which the greater part was on account of the new beam engine and new well and headings. The former had been erected and set to work, and the trial would shortly take place to ascertain that it was performing the guaranteed duty with regard to consumption of coal. The new well had been finished, and considerable progress had been made with the headings; and it was hoped that by the time they were completed there would be a very substantial increase in the supply of water. The Directors had agreed to sell the old Harrow pumping-station to the Harrow Urban District Council for the sum of £3300; and the premises were to be used for public baths. This pumping-station was taken over by the Company in 1886, when the right to supply the Harrow district was purchased from the Harrow Water-Works Company; but up to the present time the Directors had not found a favourable opportunity of disposing of it. The profit for the six months in respect of the revenue account was £8586—being an increase of £1109 as compared with the corresponding period of 1900; and the balance available for dividend, after paying the debenture stock and preference share interest and transferring £500 to reserve account, was £7428. Out of this, it was proposed to pay a dividend at the rate of 7 per cent. per annum, leaving £609 to carry forward. The Chairman (Mr. J. R. Hollond), in moving the adoption of the report and accounts, said he hoped they would be an agreeable surprise to the shareholders, as they had been to the Directors. The water-rates for the period under review amounted to £13,774, as compared with £12,328 in the corresponding half of 1900. This was an increase of £1446, which, added to the increase of £879 for the June half of last year, made a total increase for the twelve months of £2325. The average annual increase during the last four years had been £2141; whereas ten years ago the average annual increase was only £600, on account of the slowness of building at that time. During the last half year, the number of additional supplies laid on was 426, which were estimated to yield £1013 a year; while in the preceding six months they had 410 new supplies, which were calculated to yield £969 per annum. The total number of supplies was now about 11,000, and the population served 62,000, which was almost exactly double the number in 1891. The total expenditure on revenue account was only £320 more than in the six months ending December, 1900, about half of which was in respect of rates and taxes; so that the result as regarded both maintenance and management was highly satisfactory. The total quantity of water pumped was 348 million gallons, as compared with 316 millions in the corresponding period of the previous year. This represented an average per head per day for domestic consumption of just over 24 gallons, which was rather higher than usual, on account of the exceptionally dry year. The Board were again able to recommend an increase in the dividend—from 6½ to 7 per cent. per annum. There had been an average increase of ½ per cent. during each year since 1896, when the distribution was at the rate of 4½ per cent. per annum. As stated in the report, the new beam engine had been set to work, and was being used almost daily. The Consulting Engineers (Messrs. Taylor, Sons, and Santo Crimp) were very satisfied with the result so far, and would make an official test in a few weeks' time. The new well and headings would be completed in a month or six weeks, when an accurate gauging would be made of the additional yield. A very substantial and satisfactory increase had undoubtedly already been obtained. In the course of some discussion which took place, Mr. Taylor said he hoped the Directors would do all they could to protect the interests of the Company in connection with the London Water Bill just introduced. He could not help feeling that the Bill marked a crisis in the Company's history; and he trusted that no money would be spared to safeguard their property. He referred to the dual powers of supply enjoyed by their Company and the West Middlesex Water Company over a portion of the parish of Hendon. The latter Company had never exercised their rights; but he feared that the new Water Board, who were to take over the undertakings of the Metropolitan Water Companies, might at some future time do so. The Chairman replied that he thought the Government Bill contained a clause that would protect them; but anyway the matter would not be overlooked. The report was adopted, and the dividend declared.

Consett.

The annual meeting of the Consett Water Company was held last Friday, under the presidency of Mr. John Brownless. In moving the adoption of the report and accounts, the Chairman said that, owing to the long-continued drought of last summer and autumn, there was a diminution of £1732 in the income as compared with the previous year; but the cost of purchasing and pumping water had been £876 less, simply because they were unable to buy any water. The undivided profit available for dividend (including £4546 brought forward) was £11,050. After payment of the usual dividend of 4 per cent. on the preference shares, and 6½ per cent. per annum on the ordinary shares, there would be left a sum of £3595 to carry forward; so that they had had to dip into unappropriated profits to the extent of £950. To meet the requirements of a rapidly increasing population, the Directors had determined to apply to Parliament for increased powers. During the year, £13,712 had been expended on the Hisehope reservoir, bringing the total cost of the works authorized by the Act of 1894 to £126,011. The report was adopted, and a dividend at the rate of 6½ per cent. per annum on the ordinary shares, making, with the interim dividend of 6 per cent. already paid, an average dividend for the year of 6¼ per cent., was declared. An extraordinary meeting of the Company was afterwards held to consider the proposed Bill. This provides for the construction of a reservoir, the erection of a catchwater and a pumping-station, &c. The capital is to be increased. Both the Consett and Weardale and Shildon Companies have inserted a clause in their Bills favourable to the amalgamation of the two concerns.

Whitby.

At the half-yearly meeting of the Whitby Water-Works Company, dividends were declared on the preference stock at the rate of 3½ per cent. per annum; on the original shares, 9s. 6d. per share, or at the rate of 9½ per cent. per annum; and on the new (1897) shares, 6s. 7½d. per share, or at the rate of £6 13s. per annum. The accounts showed a disposable balance of £1667; and the deduction from this of the dividends named, left a balance of £399 to be carried forward.

Paris Gas Company.—The revenue of this Company for the past year was £3,475,268, compared with £3,569,698 for 1900; showing a falling-off to the extent of £94,430, or 2·64 per cent., attributable to the absence of the special demand for gas caused by the International Exhibition.

The Gas Profits Inquiry in Manchester.—The Special Committee appointed by the Manchester City Council to inquire and report as to whether the present system of allocating the gas profits is the most equitable one that can be adopted, had a meeting last Tuesday, when they accepted a suggestion of the Chairman (Alderman Gibson) that statistics shall be prepared of the name and address of every city ratepayer burning gas, the number of thousand cubic feet consumed by him during the year, and the amount at which it works out on a basis of 3d. per 1000 feet. This basis is fixed because a city rate of 4d. in the pound realizes practically the same sum as is represented by 3d. per 1000 cubic feet on the gas consumed in the city. These details will have to be obtained from the rate books and the books of the Gas Department. As the latter are not available during the daytime, and as the tabulations will involve the names of 150,000 ratepayers, the task will have to be performed largely by night, and a considerable amount of clerical work will be necessary to accomplish it.

THE MORECAMBE GAS MANAGERSHIP.

Mr. W. Duff's Compensation.

This subject was a good deal in evidence at the last meeting of the Morecambe Urban District Council. The first matter related to the fee of £105 to the Liquidator (Mr. W. Duff) of the Gas Company; and the Clerk (Mr. Tilley) said he was directed to point out that Mr. Duff had been the Manager of the Company and also Manager of the gas undertaking for the Council. He received a reply stating that Mr. Duff was appointed by the Directors to do the work for a fixed sum of 100 guineas, as they considered that he would, with his knowledge of the undertaking, be able to do the work at much less cost than if they appointed a person from outside. The Clerk was directed to make further inquiries. Mr. Tilley next read the award of the Arbitrator (Mr. Shiress Will, K.C.) in the proceedings in connection with Mr. Duff's compensation claim (*ante*, pp. 154, 196). The amount was £3800; and a cheque for it was ordered to be issued. The third matter was of an unusual character. Mr. Barnsbee moved: "That the members who voted for Mr. James R. Duff's appointment as Gas Manager on the 7th of January, 1902, confirm such votes by a show of hands, and that such votes be recorded on the minutes." He said his reason for making the motion was that he had been informed outside that Mr. Duff was not legally appointed; and the Clerk told them at the time that according to the Standing Orders the vote should have been taken by a show of hands. Instead of this, they had voted by ballot. Mr. Plews seconded the motion, and a long and animated conversation followed. Replying to questions, the Clerk stated that he had never said the appointment was not legal. What he said was that the vote was not in accordance with the Standing Orders. Eventually the motion was carried, and a show of hands taken, when five members responded.

HARWICH GAS PROVISIONAL ORDER.

Resolution to Oppose Rescinded.

It will be remembered that last month the Harwich Town Council held a special meeting, at which they decided to oppose the application of the Gas Company for a Provisional Order to enable them to erect works on the Bathside (*ante*, p. 102). The matter came up again at the quarterly meeting of the Council last Thursday, when, after an animated debate, the resolution previously arrived at was rescinded. The *agenda* stated that the Solicitors to the Gas Company had prepared and lodged an amended draft of the Order, whereby it was agreed that no nuisance should be permitted on the land on which it was proposed to erect a gasholder, nor would the Company use the land for manufacturing gas, or for the conversion of the residual products.

Mr. CANN, at the outset, objected to the Town Clerk, who was an interested party (being Solicitor to the Gas Company), acting as Clerk during the discussion; but no seconder was found to the motion that someone else should act in his place.

Alderman NALBOROUGH introduced a motion to the effect that, feeling satisfied that the interest of the inhabitants of the borough generally would be best served by reasonable facilities being given to the undertakers to extend their works, and increase their output of gas, the resolution passed at the meeting of the Council on Jan. 9, directing that a petition be lodged with the Board of Trade against the Order, be rescinded. Further, that such petition be withdrawn, and that, subject to an undertaking being given by the Solicitors to the Company to carry out the amended Order, the Council, as the Local Authority, assent to the proposals. He remarked that, at the last Council meeting he moved an amendment that they should give their sanction to the Order, provided an amended scheme for the erection of a gasholder only was submitted to the Council. This would not be the slightest nuisance; and he asked how it was possible for the Company to supply the wants of the borough, unless they obtained increased accommodation. Was it the duty of the Corporation to stop the development of a legitimate business? He had taken the opinion of a gas expert as to whether any nuisance would arise from the gasholder, and had been told that there would be no nuisance whatever.

Mr. GRICE, in seconding, said the other inhabitants of Harwich ought to be considered, besides those on Bathside.

Mr. CANN suggested that Alderman Nalborough had been in collusion with the Gas Company ever since the matter had begun.

Alderman NALBOROUGH: Do you mean they are bribing me? It is a most insulting remark to make. I am not a shareholder.

Mr. CANN: You have been in conference with them.

Alderman NALBOROUGH: I have never attended a Gas Company meeting in my life.

Mr. CANN: You undertook to do certain things for them.

Alderman NALBOROUGH: You are stating what is absolutely untrue. No one is more independent of the Gas Company than I am.

Mr. CANN, referring to a newspaper report of the last meeting of the Council, drew Alderman Nalborough's attention to the fact that he stated he was prepared to give an undertaking, on behalf of the Company, that they would only erect a gasholder, and not carry on the manufacture of gas or residual products.

Alderman NALBOROUGH: You cannot call that collusion.

Mr. CANN: That is near enough for me. Proceeding, he stated that a rumour had been circulated, with a view of influencing the minds of members, to the effect that it would cost hundreds of pounds if the Corporation opposed the Order. That was totally untrue, for if the Council's resolution of the last meeting stood, the Company could not proceed any further. There would, therefore, be no other expense entailed by the Corporation.

The TOWN CLERK: Your Solicitor will not say so.

Mr. CANN said the Town Clerk told them on the last occasion that the clause relating to the manfacture of gas was inserted to comply with the Act of Parliament. He should like to know how it was now possible to comply with the Act, if in the amended Order the clause was left out. There seemed to be many members working on behalf of the Gas Company.

The MAYOR: You are using very offensive language.

Mr. CANN replied that he could not put it in any different way. It was evidently the intention of the Company to erect, not only one, but two holders, which would be outside the building line of the street. The holders would also obstruct the light. The owners of Bathside had spent £1000 in the improvement of their property; and the erection of the holders, from which there was an obnoxious effluvium, would depreciate the value of it. He should like to know the name of Alderman Nalborough's expert.

Alderman NALBOROUGH: It is Mr. J. T. Jolliffe, the Manager of the Ipswich Gas-Works.

Mr. HILL, who expressed regret that any feeling had been introduced into the discussion, and denied that he wished to place any obstacles in the way of the progress of the Gas Company, said he thought the Council should hesitate before approving of the Order, especially when the people of Bathside had risen with one voice against it.

The motion for the rescinding of the resolution opposing the Order was then adopted by 7 votes to 1.

INCANDESCENT GAS LIGHTING IN BRISTOL.

At the Meeting of the Bristol Town Council last Tuesday, the Sanitary and Improvement Committee reported that they had had under consideration for some time past the desirability of improving the lighting of the streets, by adopting the system of incandescent gas lighting for the public lamps. The price now paid to the Bristol Gas Company for supplying gas to, lighting, extinguishing, painting, and repairing the public lamps was £2 18s. 6d. per lamp per annum. The Committee found that if the lamps were fitted with No. 4 Kern 100-candle burners and lanterns, similar to some which the Committee had put up in Clifton for experimental purposes, the Company would supply gas thereto, at the present price —viz., 2s. 1d. per 1000 cubic feet—paint and repair the lamp-posts and lanterns, keep in repair and renew the burners and mantles, light and extinguish the lamps, and clean the lanterns, at a charge of £2 12s. 6d. per lamp per annum. The cost of fitting the incandescent burners and lanterns would be about 17s. per lamp in cases where the lanterns required alteration, and about 8s. 6d. per lamp where the present lanterns could be utilized without alteration. The Committee recommended that they be authorized to adapt the public lamps for incandescent gas lighting.

The Chairman of the Committee (Alderman Cope-Proctor) said he hoped soon to be able to bring up a recommendation for a considerable extension of the electric lighting in the streets. Mr. Hughes suggested that £6000 spent in alterations to enable a private Company to compete with the city was not wise. Mr. Collins opposed the scheme, because it seemed to him that the Committee had lost their heads. If the plan proposed were adopted, the Company would put up the price of gas. It was a bad bargain, and the Committee should not be allowed to alter the lamps when originally the Company had offered to pay for the work. Mr. Lloyd said the Committee intended to provide their own lamps and burners, and spend £5000 now rather than £8000 in the future, which would have been the effect of the Company's first proposal. Mr. Jones wished to have the scheme deferred, pending the production of the new proposals as to electric lighting; and he submitted an amendment to this effect. But he was satisfied by an assurance that nothing would be done in the areas where extension of the electric light was contemplated. Mr. Billing supported the Committee's recommendation as a sort of intermediate measure. Mr. Levy pointed out that the arc lighting would be very costly in comparison with incandescent gas. The Committee's proposal would give six or eight times better light for less than the present cost. The Council adopted the recommendation.

GAS v. ELECTRICITY FOR PUBLIC LIGHTING.

Comparisons without number have been made in regard to the cost of gas and electricity; but an addition thereto may prove useful to managers and others threatened with competition. The question is mainly one of £ *s. d.*—which system is the more efficient and economical. The writer of an article in the "Bucks Advertiser" has been making an exhaustive inquiry into the cases of a number of towns; and the result of his investigation is very decidedly in favour of gas. Even as near as Ealing, electric lighting for public purposes has proved a failure; the cost of 16-candle power glow lamps being recently shown to be six times that of Welsbach-Kern incandescent gas-lamps of 60-candle power. The following table, giving the cost per lamp per annum, recently published in the "Ealing Gazette," is instructive:—

Class of Light.	Gas or Current.	Working Materials.	Adjustment of Fittings.	Lighting and Cleaning.	Repairs to Lanterns.	Total.
A. . .	£1 11 0 ..	3s. 6d. ..	1s. 4d. ..	14s. 1d. ..	3s. 5d. ..	£2 13 4
B. . .	1 12 10 ..	4 0 ..	1 4 ..	14 1 ..	3 5 ..	2 15 8
C. . .	1 17 7 ..	0 2 ..	Nil. ..	14 1 ..	3 5 ..	2 15 3
D. . .	2 6 11 ..	0 2 ..	Nil. ..	14 1 ..	3 5 ..	3 4 7
E. . .	3 5 0 ..	4 6 ..	1 0 ..	7 0 ..	2 6 ..	4 0 0
F. . .	4 15 10 ..	8 6 ..	2 8 ..	14 1 ..	3 5 ..	6 4 6

The annual cost per candle per annum by each system is—

Class of Light.	Total Cost.	Candle Power. (Nom. 75)	Annual Cost per Candle Power
A.—No. 3 Welsbach-Kern gas. .	£2 13 4 ..	60 ..	0s. 10¾d.
B.—"C" Welsbach gas. . . .	2 15 8 ..	50 ..	1 1¼
C.—Ordinary flat-flame 4-feet gas	2 15 3 ..	10 ..	5 6¾
D.— ,, ,, 5-feet gas	3 4 7 ..	14 ..	4 7¼
E.—Electric 16-candle glow lamp	4 0 0 ..	16 ..	5 0
		Nom.	
F.—Welsbach intensified gas. .	6 4 6 ..	300 ..	0 5

It will be seen from the foregoing table that E is six times the cost of A, 4½ times the cost of B, and 12 times the cost of F.

ELECTRIC LIGHTING NOTES.

Gas v. Electricity at Hornsey.

At the meeting of the Hornsey District Council on Monday last week, a report recommending the erection of 60 arc lamps in place of 87 gas-lamps now costing £265 per annum was referred back. The electric arc lamps will cost £1292. The Chairman of the Council said this was equal to a rate of ½d. in the pound; and he was not favourably disposed to arc lamps.

Municipal Trading at Taunton.

The Taunton Electric Lighting Committee have got into a little difficulty by endeavouring to extend their trading in the domain of electric power. Having embarked in the business and expended some £1400 in motors which have been let out on hire, they have had the mortification of finding that the expenditure is not approved by the Local Government Board. The outlay is to be placed to revenue account, and the business of hiring motors will not be further developed. The Board's reply to an application for sanction to a loan was that they had no power to grant it.

A Tie at Ludlow.

The Ludlow Town Council spent some time last Thursday discussing a joint scheme of electric lighting and refuse destruction. The Council last year adopted an electric light proposal, and tenders were advertised for and received. But before an official inquiry could be held, the borough boundaries were extended and a new Council elected. The majority of the representatives of the newly-added area now opposed the scheme; and, after a protracted discussion, the vote resulted in a tie—eight for and eight against. The Mayor (Alderman Atherden), who had voted in favour of the scheme, declined to give a casting vote. The question of what should be done with the Provisional Order which the Council had obtained for carrying out the installation was afterwards discussed. It was stated that several private companies had expressed a desire to start operations in the borough, if the Corporation were not inclined to proceed with their scheme under the Order. Eventually, the matter was adjourned.

Increased Voltage and Increased Bills.

Uneasiness is being displayed by Sheffield tradesmen, on account of the abnormal rise that is taking place in the amount of their electric lighting bills. Last summer the pressure was raised from 100 to 200 volts; and the consumers have noticed that since this time their bills have in many cases doubled, while the light is not so good as before. It is stated that in an outlying district, where the voltage was changed at a later period, the amount consumed within a certain time before the change compares favourably with previous similar periods; whereas under the new conditions of pressure, the meters indicate that they have consumed an extraordinary quantity. One shopkeeper has figured out that one of his monthly bills is 275 per cent. higher than in the corresponding month of the preceding year; while another who, before the pressure was changed, found that the arc lamps outside were too expensive, and had them removed, is dismayed to discover that now he consumes as much electricity as before. There is talk of a representative deputation waiting upon the authorities, to urge the necessity of some equitable arrangement being made with regard to the increased accounts. Apparently, the time is as far off as ever when any but the rich will be able to afford the use of electric light in Sheffield. In last week's "JOURNAL" (p. 366), we reported a speech made by Sir William Forwood in the Liverpool City Council, in which he said that, "after all, electricity was the light of the wealthy; it was a luxury, and must ever remain such."

Pros and Cons at Elland.

From the accounts appearing in the local Press, it is evident that Colonel A. C. Smith must have spent a most enjoyable day last Wednesday, when he visited Elland to hold an inquiry, on behalf of the Local Government Board, into the application of the Urban District Council for sanction to borrow £16,000 for the purpose of carrying out a combined electric light and refuse destructor scheme. Local opinion is by no means unanimously in favour of the proposal; and those present cross-examined each other in a most entertaining manner. Added to this, the Elland Gas Company, as ratepayers, offered a spirited opposition to the application. The Clerk to the Council (Mr. J. Clarkson) said that the total estimated cost of the proposed combined scheme was £16,000. Of this, £4906 was for the destructor and £11,094 for electric lighting. The works were to be placed on land belonging to Lord Savile, which the Council had on a lease for 999 years; and they would be in close proximity to the sewage works. The quantity of refuse to be dealt with per week was about 108 loads of dry ashes and 90 tons of liquid sludge, or a total of about 200 tons. At present, the dry ashes were deposited on a tip; and numerous complaints had been received regarding the nuisance arising from this. The area mentioned in the Provisional Order was only Southgate and Westgate; but it was intended to put down plant to supply a much larger district. That there was a demand for electric light was proved by a requisition signed by ratepayers who were desirous of taking upwards of 7000 8-candle power lamps. There were some refusals to take the light; but in the course of the proceedings, it was stated that these emanated from "men of no consequence." Mr. Longbotham, Solicitor, on behalf of the Gas Company (who, after the Railway Company, are the largest ratepayers in the town), said that his clients appeared there simply and purely as ratepayers. They supplied customers far beyond the confines of the Elland district, and supposing the scheme were to result in a loss of £1000, they would be called upon to bear their proportion. This would affect people outside the district, which he contended was very unfair. The Council estimated that they would be able to deliver the current in the houses at 4·4d. per unit; but the Gas Company were prepared to manufacture and sell it to the Council in bulk at the gas-works at 2d. per unit. This would enable the Council to supply current to the ratepayers at 3½d. per unit; and he urged the Inspector to submit this offer to the Local Government Board. Other ratepayers subsequently laid various objections to the scheme before the Inspector.

THE WATER SPIDER AND THE FLIES.

[From the "St. James's Gazette," Feb. 14.]

Study of the text of the Government's water proposals makes it evident that Mr. Long, in the shambling Bill which he has introduced, and which runs counter in almost every respect to the recommendations of the Royal Commission on the report of which it purports to be based, shows himself false to every principle which the party that has the honour of his countenance exists to support. To serve no useful purpose whatever, but to satisfy a sentiment, he has introduced a measure which merely rebounds from the Scylla of confiscation to overwhelm the unfortunate ratepayers of the London water-area in the Charybdis of municipal bankruptcy. These are strong words, but we are confident that we shall be able to justify them to our readers.

It is proposed that after an "appointed day," a Water Board shall be formed to take over the undertakings at present carried on by the various Water Companies of London for the supply of that commodity to the inhabitants. Now, there is a settled and equitable method of procedure in all cases in which, for the real or fancied good of the community, a public body acquires compulsorily the property of private individuals or companies. Each side appoints valuers, and, on failure to agree, the matter is referred to arbitrators chosen one by each side, with a third as umpire appointed by the other two. Why is this precedent, which is that of the Lands Clauses Act, not followed in Mr. Long's Bill? Instead of that, a purely arbitrary tribunal of three is set up by the Local Government Board—that is, practically, by the purchaser—and against its decision there is no appeal. Every matter is left to its "absolute discretion," and there is not even the shadow of a basis laid down in the Bill upon which the valuation of the property is to proceed. We pass over the fact that the usual 10 per cent. allowance for forced sale is not in this instance to be given, and that no account is to be taken of future dividends. A more gross unfairness is to be found in the fact that, after the "appointed day" all moneys, offices, books, &c., except such as the Local Government Board may choose to permit the Companies to keep, are to be handed over to the Water Board before the proffered water stock is allotted, or even an award is made. The Companies must either accept whatever the arbitrators choose to give them, or fight with both hands tied behind their backs. We hold no brief for the Water Companies; they are rich and powerful. But we do contend, on broad public grounds, for the spirit of fair dealing between the State and the individual which constitutes the only basis of public security, and which is so wofully lacking in Mr. Long's proposals.

But let us turn to inquire how the ratepayers will fare under the conditions of the Government Bill. We do not believe that the public have in the very least grasped the facts. The Water Board, after twenty years' grace, is to establish a sinking fund for the purpose of paying out the shareholders in the original Companies. The necessary sum to be devoted to this purpose is at the rate of £8769 per million of capital value per annum. The capital value of the property of the Water Companies is estimated at £41,000,000 sterling; so that a sum of £360,000 a year will have to be laid aside for the purpose of the sinking fund. In addition to this, the cost of equalizing the rates charged by the various Water Companies (since it is beyond doubt that no rate will be raised, but all levelled down to the lowest existing figure) will be a quarter-of-a-million a year, as estimated by the Royal Commission. There is, therefore, a sum of £610,000 a year to be provided before a penny is paid to the holders of water stock. It is, no doubt, estimated that the rise in water values will provide this sum; but, putting aside the wild-cat scheme of the County Council for obtaining water from Wales at a cost of £30,000,000, it is quite certain that the increased storage required will swallow up the greater part of the increase in the cost of building reservoirs. How, then, is the money to be obtained? The Bill itself supplies the answer: Out of the general rates of Water London. Section 11 says: "Any sum required to meet any deficiency in the water-rate, whether for satisfying past or future liabilities in any financial year. . . . [Sub-section 4] shall (if necessary) be raised out of, and as part of, the local rate." And, in this connection, it is to be remembered that the Bill *lays no obligation whatever on the Water Board to levy any water-rate at all.* The Water Board might adopt Mr. John Burns's cry of "free water," and charge the whole of the "deficiency" on the local rates of London and the surrounding districts within the limits of supply. So that the small community on whom the rates fall—the shareholders of great corporations, owners of property, struggling professional men, all above the level of the "compound householder"—have to face the prospect, if this Bill passes, of an addition of about £1,750,000 annually to their already crushing burden. We commend the prospect to the great railway companies, gas companies, breweries, and the like, which already constitute the milch cows on which any faddist demagogue pulls.

The rejection of this misbegotten Socialist bastard is, we understand, to be moved by Mr. Boulnois. We trust that, now we have exposed its real meaning, such a number of Unionists will intimate their intention of following him into the lobby that Mr. Long may be saved from himself. The Local Government Board at present, like a bloated water-spider, invites the flies into its parlour—or, rather, would compel them. They are not to be "may," but "must," flies. But, the precedent thus set, what is safe? What is to prevent a predatory body like the London County Council from acquiring by confiscation in the first instance, supplemented by a huge contingent liability on the rates, the gas-works, the tramways, the omnibus lines, or solving the housing problem in the same easy way? Every interest is threatened if this measure goes through, and "free gas," "free tram (or 'bus) rides," "free houses," are no less catching cries to those upon whose shoulders the burden will not directly fall than "free water." If the Conservative Party lend themselves to this first step, with what face can they oppose their own precedent if, in the future, a Radical Government, subservient to municipal faddists, sets itself to gratify their whims? The worst feature of the whole business is the plea advanced in its excuse of "public importance." This is tantamount to saying that, while the law will be allowed to protect a man or company possessing £100 because that sum is a trifle to pay, it will withdraw its protection if the stake at issue be only sufficiently large to

make payment inconvenient. Mr. Long has got himself into a wholly gratuitous mess by undertaking a business more costly than he cares to reveal, and is endeavouring to cover up his tracks by thoroughly disingenuous expedients.

LONDON COUNTY COUNCIL AND THE WATER QUESTION.

The Government Bill to be Opposed.

At the Meeting of the London County Council last Tuesday—Mr. A. M. TORRANCE in the chair—the Water Committee submitted their report on the London Water Bill, 1902, the principal points in which, as well as the Committee's recommendations, were given in the "JOURNAL" on that day.

Mr. T. M'KINNON WOOD (the Chairman of the Committee) moved the reception of the report. He said that, in dealing with the question of the water supply of the Metropolis, the Council had always considered the interests of the outside areas; and if they proved that the proposed authority was a bad one, it was not only bad for London but for the outside areas as well. In whatever aspect they regarded this question, it was one of extraordinary interest to the people of London. They had before them a proposal which was not merely novel and contrary to the established precedent which had worked successfully in provincial towns, but it was a proposal to revert to a system of administration which had been tried in London, and been condemned and discarded. What the Council asked was that the management of this great and vital interest to London should be in the hands of men who could be checked by direct contact with those who elected them. They had been taunted with wasting the money of the ratepayers. But when purchase came they would be justified; and he believed that every £100 the Council had spent in water legislation would mean a gain to the ratepayers of not less than £1000, unless all the advantages which had been obtained were thrown away by the Bill. The proposal of the Council was to fix the purchase price by arbitration, and that the sum of money determined upon should be either handed over to the shareholder, or he should have stock equivalent in money value. They therefore looked with suspicion on the proposal to barter stock for other stock, for this was followed by the Government in 1880, and was disadvantageous to London. He put it down that the difference to the ratepayers under that procedure would be not less than £5,000,000. If the new Water Board were not a proposal of the Government, he did not believe that 20 members of the House of Commons would be prepared to vote for it. He was not sanguine enough to hope that the Bill would not pass second reading, but he was hopeful that when it arrived in Committee it might be improved by amendment. The proposed authority was far too large. It would be a heterogeneous body without any experience, and with a great many conflicting interests, unrepresentative and irresponsible in the sense that it would be independent of the public. The object of London in his matter was to have full and effective public control of the water supply, not a bogus control by a new Metropolitan Board of Works. He believed that in a short time the Board would be in the hands of its paid Chairman and officials. In dealing with the largest water interest in the world, the Council thought they were entitled to claim autonomy for London. He hoped London would not consent to be treated with the contemptuous indifference implied in the Bill. London had twice given its decision in favour of direct public government of the water interests; and although these expressed wishes might be overborne by the Government, the Council, as Progressives, must continue to fight to the end for sound principles of local government and financial responsibility, and in defence of the great interests entrusted to their charge. He hoped the Borough Councils would refuse the bribe offered to them.

The report having been received,

Mr. H. CLARKE moved, as an amendment: "That the Council welcomes the introduction into the House of Commons of the Government's Water Bill, as affording a reasonable basis for the settlement of a difficult question." He remarked that, whatever might be said against the Bill, the people of London ought to know that it offered them an opportunity of acquiring the undertakings of the Water Companies on fair terms. They might thereby remove themselves from the arbitrary rule of the Companies, without calling upon the ratepayers to contribute any portion of the money. With regard to the proposed Board, he believed that for such a purpose as the one in question it was far better to have too many members than too few. As it was, it was suggested that London should have 46 out of the 69 members. He appealed to the members not through party considerations to throw away this chance of settling the London Water Question.

Mr. R. A. ROBINSON seconded the amendment. He said the outside districts did not want the whole of the control of the water supply to be left in the hands of the Council. So great were the interests involved, and so wide was the area to be administered, that he did not believe the proposed Board would be too large. He looked upon the Bill, as a whole, as one of a very democratic character, and he could not see why it should be so stoutly condemned by the Progressives, who seemed to have but little faith in the new London local authorities. No Government could introduce a Bill dealing with so large an area and force upon the unwilling outside bodies an authority emanating chiefly from the County Council. There was evidence in the Bill that the Government were inclined to listen to the Council, provided they were not met with complete opposition from that body. For this reason, he thought it was best that they should accept the Bill as it stood as a fair and reasonable settlement of a difficult question.

Mr. DICKINSON said the principles put forward in this Bill were so antagonistic to London that they could not go so far as to welcome it as a contribution to the settlement of the question. Dealing with the financial portions of the Bill, he pointed out that care must be exercised, in regard to payment, to give as good a security, producing the same income as the existing stock, but not a better one. In considering the security represented by the Water Companies' stock, there were many matters to be taken into account, especially the large amount of

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 411.

Issue.	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 11	10½	Alliance & Dublin 10 p.c.	18—19	..	5 10 6
100,000	10	,,	7½	Do. 7 p.c.	13—14	..	5 7 2
300,000	100	Jan. 2	5	Australian 5 p.c. Deb. .	100—102	+1	4 18 0
200,000	5	Nov. 13	6½	Bombay, Ltd. . . .	6¼—6⅜	..	4 16 4
40,000	5	,,	6½	Do. New, £4 paid	4¼—4⅜	..	5 9 5
380,000	Stk.	Feb. 13	12	Brentford Consolidated	260—265*	+1	4 10 7
270,000	,,	,,	9	Do. New . . .	187—192*	..	4 13 9
50,000	,,	,,	5	Do. 5 p.c. Pref. .	128—133*	..	3 15 2
206,250	,,	Dec. 13	4	Do. 4 p.c. Deb. .	112—115	..	3 9 7
220,000	Stk.	Sept. 12	10	Brighton & Hove Orig.	210—215	..	4 13 0
246,320	,,	,,	7	Do. A. Ord. Stk. .	150—155	..	4 10 4
420,000	20	Sept. 27	10	British.	41—42	..	4 15 3
50,000	10	Feb. 13	12	Bromley, Ord. 10 p.c. .	23—25*	..	4 16 0
82,850	10	,,	9	Do. 7 p.c. . . .	18—20*	..	4 10 0
500,000	10	Oct. 11	6	Buenos Ayres (New) Ltd.	9⅜—10¼	+⅛	5 17 1
220,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	94—97	..	4 2 6
150,000	20	July 17	8½	Cagliari, Ltd. . . .	22—24	..	6 17 6
100,000	10	Sept. 27	10	Cape Town & Dis., Ltd.	15—16	..	6 5 0
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
550,000	Stk.	Oct. 11	12	Commercial Old Stock	265—270	..	4 5 11
236,425	,,	,,	9	Do. New do. .	203—208	..	4 6 7
238,237	,,	Dec. 13	4½	Do. 4½ p.c. Deb.	130—135	..	3 6 8
800,000	Stk.	,,	9	Continental Union, Ltd.	162—167	..	5 7 9
200,000	,,	,,	7	Do. 7 p.c. Pref.	160—165	..	4 4 10
575,000	Stk.	Aug. 29	5	Crystal Palace Ord. 5 p.c.	122—127	..	3 18 9
60,000	,,	,,	5	Do. 5 p.c. Pref.	123—128	..	3 18 2
486,090	10	Jan. 30	10½	European, Ltd. . . .	18½—19½	..	5 7 8
354,060	10	,,	10½	Do. £7 10s. paid	13½—14½	..	5 8 8
15,213,200	Stk.	Feb. 13	4 1/16	Gas-light and Coke — 4 p.c. Ord.	93—95*	−1¼	4 12 7
2,600,000	,,	,,	3⅜	Gas-light and Coke — 3⅜ p.c. max.	89—91*	..	3 16 11
3,799,735	,,	,,	4	Gas-light and Coke — 4 p.c. Con. Pref.	109—112*	..	3 11 5
4,193,975	,,	Dec. 13	3	Gas-light and Coke — 3 p.c. Con. Deb.	92—94	..	3 3 10
70,000	10	Nov. 13	8	Hongkong & China, Ltd.	13—14	..	5 14 4
3,800,000	Stk.	Nov. 13	10	Imperial Continental .	211—214	−2	4 13 6
473,600	Stk.	Feb. 13	3½	Do. 3½ p.c. Deb. Red.	99—101*	+¾	3 9 4
561,000	Stk.	Aug. 29	10	Liverpool United A .	232—234	..	4 5 6
718,100	,,	,,	7	Do. do. B .	171—173	..	4 0 11
306,083	,,	Dec. 30	4	Do. do. Deb. Stk.	118—120	..	3 6 8
75,000	5	Dec. 13	4	Malta & Medn., Ltd. .	4¼—5	..	4 0 0
560,000	100	Oct. 1	5	Met. of — 5 p.c. Deb.	107—111	+1	4 10 1
250,000	100	,,	4½	Melbourne — 4½ p.c. Deb.	103—105	+1	4 5 9
541,020	20	Nov. 13	3½	Monte Video, Ltd. . .	9—10	..	7 0 0
1,515,832	Stk.	Aug. 9	4½	Newc'tle & G'tesh'd Con.	106—108	+1	4 1 0
312,855	,k.	Dec. 27	3½	Do. 3½ p.c. Deb.	98—100	..	3 10 0
150,000	5	Nov. 28	8	Oriental, Ltd. . . .	7⅞—8	..	5 0 0
135,000	4½	,,	8	Do.	6¾—7¼	..	4 19 4
15,000	1	,,	8	Do.	1¼—1⅜	..	4 11 5
60,000	5	Sept. 27	7	Ottoman, Ltd. . . .	5⅜—6½	..	5 12 0

* Ex. div.

Issue.	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
851,070	10	Oct. 11	7	River Plate Ord. . .	10—10⅛	..	6 13 4
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb. .	95—98	..	4 1 8
250,000	10	Sept. 27	8	San Paulo, Ltd. . . .	11½—12½	+½	6 8 0
135,000	Stk.	Sept. 12	10	Sheffield A	244—246	..	4 1 4
209,984	,,	,,	10	Do. B	243—245	..	4 1 8
523,498	,,	,,	10	Do. C	242—244	..	4 2 0
5,850,000	Stk.	Feb. 13	5	South Met., 4 p.c. Ord.	123—126*	..	3 19 4
1,627,965	,,	Jan. 16	3	Do. 3 p.c. Deb. . .	92—94	..	3 3 10
380,940	Stk.	Nov. 13	5	Southampton Ord. . .	104—108	..	4 12 7
70,825	,,	Jan. 16	4	Do. 4 p.c. Deb.	100—103	..	3 17 8
120,000	Stk.	Aug. 29	5½	Tottenham and Edmonton — A. 5 p.c.	122—127	..	4 6 8
250,520	,,	,,	4	Tottenham and Edmonton — B. 3½ p.c.	95—100	..	4 0 0
182,380	10	Jan. 16	5	Tuscan, Ltd.. . . .	7—8	..	6 5 0
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	95—98	..	5 2 0
230,000	5	Aug. 15	9	West Ham, 10 p.c. . .	9⅜—10½	..	4 5 9
172,000	10	,,	6	Do. 7 p.c. . .	12½—13⅜	..	4 8 11
140,900	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	105—110	..	3 12 9
				WATER COMPANIES.			
780,599	Stk.	Dec. 30	11⅓	Chelsea, Ord. . .	315—325	−10	3 10 9
150,000	,,	,,	5	Do. 5 p.c. Pref. .	155—160	..	3 2 6
160,000	,,	,,	4½	Do. 4½ p.c. Pref. '75	140—145	..	3 2 1
175,785	,,	Sept. 27	4½	Do. 4½ p.c. Deb. .	142—147	..	3 1 3
1,720,560	Stk.	Oct. 11	7	East London, Ord.. .	204—209	−1	3 7 0
654,740	,,	Dec. 13	4½	Do. 4½ p.c. Deb. .	143—148	..	3 0 10
1,018,046	,,	,,	3	Do. 3 p.c. Deb. .	97—99	..	3 0 7
700,000	50	Dec. 13	8	Grand Junction — 10 p.c. max..	112—117	−5	3 8 5
310,000	Stk.	Sept. 27	4	Grand Junction — 4 p.c. Deb..	127—132	..	3 0 7
708,000	Stk.	Feb. 13	16	Kent	300—310*	+3	5 3 3
160,000	,,	,,	7	Do. New, 7 p.c. max..	200—210*	−1½	3 6 8
1,043,800	100	Dec. 30	10½	Lambeth, 10 p.c. max..	305—310	−5	3 7 9
406,200	100	,,	8	Do. 7½ p.c. max..	220—230	..	3 9 7
350,000	Stk.	Sept. 27	4	Do. 4 p.c. Deb..	125—130	..	3 1 7
500,000	100	Feb. 13	12 1/16	New River, New Shares	405—410*	+2½	3 7 9
1,000,000	Stk.	Jan. 30	4	Do. 4 p.c. Deb..	127—130	..	3 1 7
902,300	Stk.	Dec. 13	7	South-wark and Vauxhall — Ord. . . .	200—210	−3½	3 6 8
126,500	100	,,	7	South-wark and Vauxhall — 7½ p.c. max.	190—200	..	3 10 0
489,200	Stk.	,,	5	South-wark and Vauxhall — 5 p.c. Pref. .	155—160	..	3 2 6
1,019,585	,,	Oct. 11	4	South-wark and Vauxhall — 4 p.c. A Deb.	125—130	..	3 1 7
1,155,066	Stk.	Dec. 13	10	West Middlesex. . .	295—305	−10	3 5 7
200,000	,,	,,	4½	Do. 4½ p.c. Deb. .	140—145	..	3 2 1
200,000	,,	Sept 12	3	Do. 3 p.c. Deb. .	96—98	..	3 1 3

* Ex. div.

unproductive capital which they would have to spend in the future. The Stock Exchange evidently took a favourable view of the proposals of the Government; for since Mr. Long's speech in introducing the measure, the stocks of the various Companies had been enhanced in value by no less than £1,037,000. After adversely criticizing the constitution and method of election of the proposed Water Board, he pointed out that it was the settled policy under the London Government Act that central work should be carried out by the central authority, and local work by the local authority. The Bill now proposed a departure from this settlement, which was the only arrangement under which the Council and the Borough Councils could work in harmony. Some years ago, when the water supply was not in so satisfactory a state as at present, there was necessity for hastening on the matter; but, under present circumstances, there was no need for hurry. The Government should certainly consult the Council on this subject; and if the Bill were now put off for a time, no detriment would accrue, and it might be successfully amended.

Mr. HARRIS thought it could hardly be seriously contended that the financial clauses of the Bill did not offer a basis of settlement of the question. The recommendation of the Committee was designed to ending, and not mending, the Bill. After dealing with the circumstances which led up to the Bill, he confessed that, as a councillor, the position of the Council was not a very palatable one to him. He felt that there were certain objections to the proposed Water Board; but what they had to consider was whether those objections were so fatal that the Bill should not pass its second reading. After considering the whole of the circumstances, he had come to the conclusion that the objections were exaggerated; but he hoped the Government would deal with them in a spirit of compromise.

Mr. CORNWALL characterized the Bill as bad and reactionary, and an underhanded attack on the Council. With regard to the constitution of the Water Board, it was against the recommendations of Lord Llandaff's Commission. The Council would be lacking in their duty to their constituents and to London if they failed strenuously to oppose the Bill on second reading.

Mr. BEACHCROFT said the chance was now offered of settling a vexed question. The Bill disposed of the question of purchase, and provided a tribunal such as he believed the Council desired; and there was to be no additional 10 per cent. for compulsory purchase. He would ask them whether they were going to wreck the Bill simply on the question of the authority, which was the only point for discussion. Unless the water question was settled now, they would never dispossess the Water Companies. He was not at all sure that he liked the proposed Board. It was, however, framed with the laudable desire, after the Commission had reported that the London County Council was not to be the Water Authority, of giving London the largest possible representation, as strongly desired by the Council. The members of the Borough Councils were as worthy to sit on the new Board as were those of the London County Council. After all, the establishment of the Board was only a tentative measure; and if it was found not to be up to its work, it was open to the Council to apply to Parliament for a change in its constitution. In point of fact, the Bill provided for an alteration in the body, and empowered the Local Government Board to take the necessary steps for the purpose.

Mr. STUART said it was impossible to separate the question of authority from that of finance, because the purchase had to be carried out by the new body. The financial clauses certainly formed a basis for settlement; but the constitution of the Board was so bad that they could not possibly accept it.

Mr. PEEL, M.P., objected to the attitude of the Progressives, because behind it was the desire to wreck the whole Bill. The objections urged against it were only on matters of detail, and were not such as to justify them in rejecting it on second reading.

Colonel PROBYN said he was gratified to find that the Bill was of so representative a character. The opposition now offered to it was only of a political character; and in his opinion the Council should support it heartily and cordially.

Mr. M'KINNON WOOD, in replying upon the debate, characterized the amendment as a feeble attempt to make the best of a bad job. In what he had said against the proposed Water Board, he was only unconsciously following the lead of Lord Salisbury, who in 1894 said that among the duties of the central body for London were such matters as main drainage, the management of the river, and, if they would, the water supply.

After a debate which lasted nearly four hours, the closure was carried, and the Council divided, when the amendment was rejected by 85 votes to 27—a majority of 58.

The first recommendation was then submitted, as follows: "That the interests of the people of London in the acquisition and administration of the water supply are so vital that they ought not to be entrusted to a Water Board nominated by 78 different authorities and independent of public control." It was carried by 82 votes to 26. The other recommendations (*ante*, p. 366) were carried by large majorities.

BRISTOL CORPORATION AND THE WATER COMPANY.

At the Meeting of the Bristol Corporation on Tuesday, the Parliamentary Bills Committee reported (*inter alia*) that the Bristol Water Bill should be petitioned against, in order to obtain the insertion of such clauses and provisions as might be necessary for the protection of rights and interests, particularly upon the following points: (1) Getting the charges made by the Water Company in the districts of Stapleton, Horfield, and that part of Brislington which is within the city reduced to the high-level rates imposed in respect of other parts of the city, (2) reducing the amount of additional capital authorized by the Bill to be raised; (3) getting a clause inserted requiring the Company to give up sufficient land to widen Wood Lane to 40 feet; and (4) having a proviso to clause 18 inserted to the effect that all sewers constructed by the Company within the city should vest in the Corporation.

The Chairman of the Committee (Alderman Pearson) in moving the

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adoption of the report, explained that an opportunity had now come when the Council might ask the Company for some concession to the newly-added districts, and for the other things. Soon after the extension Act of 1897 was passed, the Company, with wise generosity, abandoned their extra charge; and it might be that this spirit of "sweet reasonableness" would still be found with them. The Committee wished to discuss the various matters with the Directors, and, in case it was found necessary, to have leave to oppose the Bill. Mr. Harris seconded the motion, and compared the charges of the Company for a £30 house at Stapleton, Horfield, and Brislington, with those paid for a supply to like houses in other towns; the difference against Bristol being 9s. as compared with Birmingham, 26s. 8d. as compared with Leeds, and £2 2s. 10d. as compared with Manchester. The rateable value of the three districts had grown enormously since the Company laid their mains in 1865; and even since 1897 the income from them must have gone up £4000 a year. They could, therefore, well afford to grant the reduced rate. Mr. Levy-Langfield took up the case of the tenant of part of a house who was charged at trade rates for water when living on premises which were also used as a dwelling, and moved an amendment directing the Committee to get a clearer definition of the term "trade purposes." Mr. Billing seconded this. Mr. Collins pointed out that the Company were put to great cost in pumping water, and necessarily the charges were greater in the higher districts than they were where the water could be supplied by gravitation. The Company had made concessions to the Corporation for the supply of water, and also to the School Board and the occupiers of £20 houses. Mr. Barnett said the Company had powers outside what was now the law of the land, and, as a consequence, there were many thousands of citizens deprived of the enjoyment of comforts and health advantages which otherwise they would have. Alderman Pearson deprecated any suggestion of an attack on the Company, and promised consideration of the amendment. The Committee wanted to get changes without fighting; but if they were forced to fight, then no Committee would do it more readily than the one over which he had the honour to preside.

Mr. Levy-Langfield's amendment having been withdrawn, Mr. Pope moved that the Committee be instructed to endeavour to get a clause inserted in the Bill giving the Corporation power to purchase the undertaking if deemed desirable in future. Mr. Harris obtained the ruling of the Lord Mayor, who was in the chair, that the amendment was in order, notwithstanding the decision of the Council against purchase within the last six months. Mr. Jones seconded the amendment. Mr. Boyd believed it would pay the city to buy now; and he said that if they did not do so, ten years hence those councillors who were alive would regret their folly. Mr. Elkins thought it was not expedient to try to get the clause inserted just now. Alderman Pearson took the same line. He said he was an advocate of purchase, but he thought they would jeopardize the success of their present opposition if, after they had but four months ago said they would not buy, they now asked for a purchase clause. On a vote, the amendment was negatived, and the report adopted.

SEVENOAKS WATER PURCHASE QUESTION.

At the last Meeting of the Sevenoaks Urban District Council, it was reported that the Water Company had written saying that they could not see their way to accept the offer of £86,610 which the Sub-Committee had been authorized by the Council to make for the undertaking (*ante*, p. 297). A letter was read from Mr. James Dixon, of Edenbridge, in which he contended that the sum offered by the Council was a great deal more than the Company would be awarded if arbitration was resorted to. The writer complained of the "extortionate charges" of the Company, and said that "any statement of revenue based upon such unjust charges must fall to the ground in arbitration." The Chairman (Rev. J. Jackson) remarked that they had made a liberal offer, and he would not suggest that they should make another. Mr. Outram said he was excluded from the discussion because he was a shareholder. He would like to point out that in 1900 the rateable value of the district was £49,939, and in 1901 £54,909, an increase of £5070 in one year. If they went on at this rate, the Company would become of enormous value. He was informed that they would pay during the next half year the full statutory dividends of 10 per cent. and 7 per cent.; he urged upon the Council the advisability of taking over the undertaking, and not letting the chance slip. Mr. Robinson proposed that the question of the advisability of proceeding to arbitration should be referred to a meeting in committee. He thought it would be a pity to lose the chance, as it was the desire of the whole town that the Council should buy the works. This was agreed to.

THE COST OF THE BARNSLEY NEW WATER-WORKS.

The Increased Outlay Required.

At the Meeting of the Barnsley Town Council last Tuesday, the statement reported in the "JOURNAL" for Jan. 21—as to the extraordinary divergence between the estimates prepared for carrying out the new water-works scheme, and the latest reports as to what the ultimate cost will be—was referred to by Alderman Holden. He said that the statement by the Mayor, with regard to the increased estimates of £120,000 for the Midhope water scheme, was in conflict with the exhaustive statement made by Alderman Raley, the Chairman of the Water Committee. Alderman Holden urged the importance of the Council being placed in possession of the fullest information, and asked if the 5 per cent. commission on the undertaking for the Consulting Engineer (Mr. Charles Hawksley) was provided for in the estimates. Replying, the Mayor said the point which struck him was that it was difficult to understand how a man of Mr. Hawksley's position could make such a serious mistake, and if it had been known the undertaking would cost £300,000, possibly the Corporation might have thought very seriously whether or not they could entertain the question. Speaking personally, and as a ratepayer, he did think that

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Mr. Hawksley had not treated the town quite right in giving an estimate for £170,000, and then coming for an increased amount of £120,000. He had no animosity against Mr. Hawksley, whom he had always found a gentleman. Also, expressing an individual opinion, he felt that, considering that Mr. Hawksley would receive about £12,000 for commission, the Corporation were entitled to more of his personal services, and he had no reason to depart from it. That was his own opinion; but he added, replying to a question, that he did not suggest that Mr. Hawksley had purposely misled the Committee in the estimates. Alderman Holden expressed himself as satisfied; but Alderman Raley remarked that it would have been better if such a matter had been raised by the Mayor in committee. On one occasion, when one or two members of the Water Committee were inclined to find fault with Mr. Hawksley, it was the present Mayor who rather glossed over the remarks.

NEW WATER SUPPLY FOR SWINDON.

Messrs. W. O. E. Meade-King and E. P. Burd, two Inspectors of the Local Government Board, attended last Thursday, at Swindon, to inquire into an application by the Corporation for a Provisional Order, the object of which is to partially alter and amend the Swindon Water Act, 1894. They seek to purchase additional lands and easements by agreement, construct additional works, and borrow such further sums as may from time to time be requisite for the purposes of their water undertaking. The second part of the application had to do with the increased powers of borrowing, the application of revenue, the supply of water in bulk to other authorities, companies, and persons, and the collection of water-rates. The Town Clerk (Mr. R. Hilton) explained that the population of the town was rapidly increasing, and when the Corporation came into existence last year they at once set about getting an additional quantity of water. A well had been sunk at Ogbourne, in the chalk hills near Swindon, and Mr. Whitaker, who had examined the site, was satisfied that a good and ample supply could be obtained from the lower chalk, and that what the Corporation proposed to do would not injuriously affect any adjoining interest. The well had been sunk to a depth of 105 feet, and yielded upwards of 200,000 gallons in 24 hours; but the town would not require all this water, and they only proposed to pump from the well for three months in the year. The reason the Corporation asked for power to create this new supply was that for many years the present source had been insufficient, and the Corporation had to purchase from the Great Western Railway Company sometimes as much as 12 million gallons yearly of water which they obtained from Kemble. Mr. Whitaker, in the course of his evidence, suggested that 200 acres around the source of the new supply should be laid out in pasture instead of arable land. There would then, in his opinion, be no chance of organic pollution—a view which was endorsed by Dr. Streeten, the Medical Officer of Health for Swindon, and Dr. Thomas, the Medical Officer of Health for Wiltshire. Mr. G. J. Churchward, ex-Mayor of Swindon, said it had been argued that the supply from the lower chalk would be exhausted; but this was not so. Experiments at the source of the existing town supply at Wroughton had proved that any depletion of the chalk which took place in the summer was recovered in the winter months. After the inquiry, the Inspectors visited the site of the proposed new supply.

THE NEW WATER-WORKS FOR LEEDS.

On Monday last week, Mr. E. J. Silcock, M.Inst.C.E., delivered a lecture before the members of the Yorkshire College Engineering Society, at Leeds, on the new water-works which have been sanctioned by the Corporation. He commenced by giving an historical sketch of the Leeds Water-Works, commencing from the time (prior to 1837) when the water was pumped from the River Aire in the neighbourhood of Leeds Bridge. This was succeeded by an outline of the proposed works, with special reference to the general principles to be followed in the design of works of a similar character. The lecturer stated that the available supply of water from the Washburn Valley was 18½ million gallons a day, and at the present time the daily consumption of water in Leeds was about 16 million gallons. The Corporation were therefore brought last year face to face with the position that their consumption was within 15 per cent. of the total available water at their command. The time had arrived—if, indeed, it had not already passed—when they should bestir themselves to obtain further powers for securing an additional supply for the city. Passing on to describe the works authorized by the Act of 1901, Mr. Silcock said that, briefly, they consisted of power to construct storage reservoirs in the valleys of the Rivers Burn and Laver. The water from these was to be conveyed by means of iron pipe aqueducts from the reservoirs to a tunnel passing through the ridge dividing the watersheds of the Nidd and Wharfe, and delivering it in the Washburn Valley at a point near the top water-line of the existing Swinsty reservoir. At the present time, the water-works of Leeds in the Washburn Valley were surrounded on the north and west by the gathering-grounds of Bradford, Yeadon, Shipley, and other towns, while farther, in a north-westerly direction, the upper portion of the valley of the Nidd was occupied by the gathering-grounds of the new Nidd works for augmenting the supply of the Bradford Corporation. After excluding the grounds already occupied by existing and projected water-works, there remained no areas other than those of the Burn, Laver, and Skell, which could be utilized for the purpose of collecting water on any scale at all commensurate with the requirements of a city like Leeds. Considerable attention was next devoted by the lecturer to such topics as the means adopted by engineers in determining the requirements of water for towns, the method of calculating the water available for different watersheds, the rate of increase in the population, variations of trade and domestic consumption, the selection of sites for reservoirs, the question of compensation, and the difficulties arising from opposition

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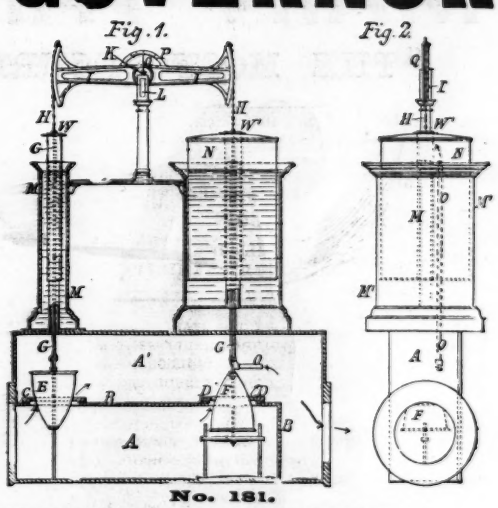

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by landowners. It was mentioned that the net result of the modifications which took place in the Leeds scheme before it received the sanction of Parliament left the Corporation with two reservoirs in the Burn Valley and two in the Laver Valley; while the Skell Valley was not appropriated by any other authority, and was still there for Leeds to go to at some future period. From a water-producing point of view, the net result was, said the lecturer, to reduce the quantity available for Leeds from 19,400,000 gallons to 15,600,000 gallons a day.

With reference to the cost of the works, Mr. Silcock said the estimate deposited with the Bill was for £2,750,000. As, however, the scope of the Bill was modified, this had to be revised by deductiug from it the cost of the Healey and Skeldon reservoirs, and also that of purchasing lands in the Burn Valley. The estimated cost was, therefore, brought down to £2,200,000. This sum would be borrowed on the security of the rates of the city, and the repayment would be spread over a number of years. The Corporation would probably be able to borrow at about 3 per cent., and the Act of Parliament allowed them to charge to capital account payments for interest until the works were partially completed. When they were finished, the Corporation would have provided for the city a supply of water which, under all ordinary circumstances, would be sufficient in quantity to satisfy the requirements of the population for at least fifty years.

A vote of thanks was accorded to Mr. Silcock at the close of his interesting lecture.

CURIOUS DISPUTE AS TO PIPE-CASTING.

A short time ago, the Longtown District Council, having on hand a scheme for the supply of two rural parishes, including the village of Longtown, with water at an estimated cost of £17,000, decided recently to accept the tender of Messrs. Drummond, of Dumfries, to do the work for £10,317. The firm declined to sign the contract on the ground that, while the specification on which it was based provided that the pipes should be "of even thickness and true bore throughout," the conditions stated the specific way in which the pipes ought to be cast—viz., "vertically cast, socket downwards, in dry sand." The Contractors' contention was that the ordinary trade reading of the specification was that the pipes should be cast on the slope, and that if the condition were insisted upon their tender would have to be increased by £1793. This made their tender £522 higher than another which had been passed by. They intimated their willingness to withdraw from the contract provided their expenses up to date and the claims of founders, who had refused other work so as to be able to fulfil Messrs. Drummond's order, were reimbursed by the Council. The Council's Engineer expressed the opinion, which, he said, was supported by five of the firms who had contracted for the work, that the trade reading of the clause "of even thickness and true bore throughout" was that the pipes should be vertically cast, as this was the only means of ensuring even thickness and true bore. The Council had, accordingly, offered to make the condition to read the same as the specification; but they had received no acceptance of the altered conditions from Messrs. Drummond. The Council accordingly decided, at their meeting last Tuesday, to enter into negotiations with the firm whose tender was next on the list, who had tendered to do the work for £11,588.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Town Council of Dunfermline on Monday considered the report by Mr. A. Waddell, the Manager of the Corporation gas-works, regarding the extensions he considers necessary at the works. These are: An additional bench of 16 through or 32 single horizontal retorts, at a cost of about £1500; the erection of coal and coke handling plant, including manual charging and drawing machinery; a light railway, overhead and underground; a waggon lift; and a screen for coke. Hand stoking costs 2s. 6·9d. per ton; by machinery it would cost 1s. 8·9d. per ton, and a saving of £416 a year, upon 10,000 tons of coal, would thereby be effected. The handling of coal at present costs 2·92d. per ton; by machinery it would cost 1·42d. per ton, and there would be a saving of £62 10s. a year. The screening of coke and placing it on railway waggons costs 1s. 3·52d. per ton; by the plant proposed it would cost 5·52d. per ton, and a saving of £187 10s. a year would be effected. These three sums amount to £666. The probable cost of the plant Mr. Waddell estimates at £2500. Allowing 10 per cent. upon this sum for interest, sinking fund, and repairs, £250 would be required; and thus there would be an annual saving to the Corporation of £416. The Gas Committee recommended that the works proposed by the Manager be gone on with. In the Council, Mr. Blair moved that the plant for handling coal and coke be not proceeded with. Their capital expenditure, he said, had been as high as their contributions to sinking fund. Provost Scobie pointed out that they were making 70 million cubic feet of gas a year more than they did when they took over the undertaking. Mr. Hoey also pointed out that while they had laid aside £7600 to the sinking fund, they had spent £7300 on the works out of revenue. The recommendation of the Committee was adopted. Mr. Waddell recommended, in order to obviate complaints by the workmen, which were referred to in a letter by the Inspector under the Alkali Act, that a cast-iron purifier, 14 feet square, and an atmospheric condenser, be erected in connection with the sulphate plant in the gas-works. The use of water for cooling would then be dispensed with entirely. The probable cost would be £120. The Council gave their sanction to the proposals.

The Perth Town Council having failed to find a purchaser for the site of the old gas-works in the city, have resolved to erect upon part of it dwellings for the people who will be dispossessed of their holdings in consequence of the formation of a new street at the City Hall. At the meeting of the Town Council this week, a letter was received from a butcher, desiring to know whether there was any probability of the

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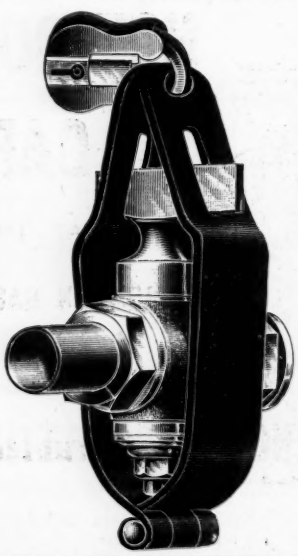

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price of gas for motive power purposes being reduced, as is the case with electric current for motors. The Clerk was instructed to reply that the Council could not, in the meantime, make any reduction in the price of gas, beyond allowing a discount at the rate of 5 per cent. The Convener of the Gas Committee and the Clerk were asked to look into the matter before the time arrives for the fixing of the price of gas for next year. This will raise for the Corporation the whole question of differential prices for gas.

The Broughty Ferry Town Council on Monday agreed to proceed with the proposed extensions at the Corporation gas-works, at a cost of between £6000 and £7000. The Council also had before them a report upon the subject of a site for the electric lighting works which they are about to erect. The question dealt with was whether the works should be erected upon Corporation land in Dundas Street, or at the gas-works. Mr. Balfour, the expert consulted, reported that there would be a saving of £300 a year by placing the works in the gas-works. In discussing the report, Mr. Lindsay said he would like to know if the probability of the future extension of the gas-works had entered into Mr. Balfour's calculations. He proposed that the matter be remitted to the Gas Committee to inquire and report—(1) As to the effect the appropriation of the ground might have on the future development of the gas-works; (2) to ascertain from Mr. Balfour details of the duties that he proposed should be performed by the Gas Manager, and which would result in an annual saving of £142; (3) as to the necessary alterations in the gas-works staff; (4) as to the cost of such, together with any increase of salary to the Gas Manager should he be appointed; (5) as to the Gas Manager's practical experience and qualifications as an electrical engineer; and (6) as to whether it is usual to conjoin the two departments, and whether such conjunctions have worked well. The Council resolved to discuss these subjects with Mr. Balfour, before sending the matter to a Committee.

The Town Council of Dumfries have adopted the recommendation of the Gas Committee, and have delayed consideration for a month of the report by the Gas Manager, Mr. G. Malam, proposing an expenditure of about £15,000 upon extensions at the gas-works. Mr. Currie, the Convener of the Committee, pleaded for permission to proceed with the erection of a new gasholder, the provision of a new boiler, and the enlargement of the tar and liquor tank. Their maximum daily output of gas, he said, was 455,000 cubic feet, and they had only storage for 250,000 cubic feet. In the event of any hitch occurring in any part of the gas-works, the town would be left in darkness. They had been approached upon the subject of Sunday labour; but until they got a new gasholder, he was afraid they could not do much in the way of giving the men relief on Sundays. Mr. Currie also asked the Council to sanction the procuring of the new steam-boiler, as the present one has been in constant use for twenty-four years. With reference to the tar and liquor tank, he stated that if the Contractor did not remove the tar and liquor daily the tank would overflow, and they would lose a large quantity of their products. Mr. Thomson, who voiced the opposition, thought it was too great a demand to ask them to construct a gasholder of double the capacity of the present one, and which could be afterwards increased to three times the capacity. He believed that more gasholder accommodation was required; but he could not support so extreme a proposal as that before them. The time might be far off when houses would be warmed and lighted by electricity; but he believed it was coming, and then they would see that it would have been the wiser course to have kept this money in their pockets. Well, of course, Mr. Thomson has got the subject put off so that it will come up a month nearer the period of his great expectations. When it comes up, then the Council will have to agree to the enlargement of the holder capacity; and wherein will have consisted the benefit to the community of the delay?

There have been complaints in Lanark as to bad smells, which have been traced to gas escaping from disused pipes. The subject was discussed at a meeting of the Town Council this week. It was stated that the Gas Company have instructed a disused gas-pipe to be lifted; but have intimated that, in the event of no pipe being found below the pavement, they will hold the Town Council responsible for the cost. The Streets Committee have received instructions to look at once into the matters mentioned.

Mr. J. M'Gilchrist, of Dumbarton, has received instructions from the Town Council of North Berwick to proceed with the preparation of plans for the new gas-works which the Corporation are about to erect there. Something better than usual may be looked for, as the requirements of this highly fashionable burgh are not of an ordinary kind. Mr. M'Gilchrist has been engaged for some time in making a valuation of the undertaking of the Bellshill Gas Company, which serves one of the most rapidly advancing districts in the United Kingdom.

Mr. A. Yuill, of Alloa, has prepared a report for the Kilsyth Town Council upon the condition of the burgh gas-works. In Mr. Yuill's opinion, with the exception of the meters, nearly the whole works require reconstruction if the Commissioners are to be in a position to manufacture double the present output of gas. He estimates the cost at £2175. It was reported by the Manager—Mr. W. Kellock—that he had been making an inspection of the gas-pipes throughout the town, and that he found they were too small to give a sufficient supply of gas. The pressures he had taken at different places were not at all encouraging. There were complaints that the gas was bad; but the gas was all right if they could get plenty of it. The Council agreed to have a conference with Mr. Yuill, and to endeavour to get him to modify his report.

It was reported to the Corporation of Johnstone this week that the extensions to the gas-works, which were brought into use last October, had accomplished wonders. The cost of the extensions had been £9989. It is interesting to know that the estimate of Mr. J. M'Gilchrist, of Dumbarton, who was Consulting Engineer for the extensions—as he has been to the Corporation of Johnstone for the past twenty years—was £10,000. This is evidence of careful work.

A coal breaker named David Peffers, 59 years of age, employed by the Edinburgh and Leith Gas Commissioners, was found dead in the pot-house of the Leith Gas-Works at an early hour on Tuesday morning. It is supposed that he had gone to the place to rest, choosing it

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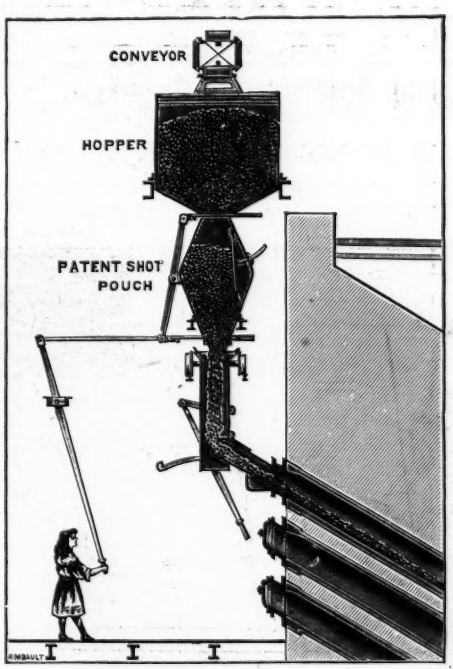

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on account of its warmth, and that, dropping off to sleep, he had been suffocated by the fumes. The last time he was seen alive he was sitting on a brick, and it is believed that he slipped off his seat.

Mr. Charles Hawksley, of London, was in Aberdeen at the beginning of this week in connection with his appointment by the Town Council to report to them as to the position of the water supply of the city. On Monday he met a Sub-Committee of the Water Commissioners, and explained to them that he proposed to inspect the present aqueduct between the intake from the River Dee at Invercannie and Aberdeen —a distance of over twenty miles. His intention was to examine the surface of the ground, and where there appeared to be contamination, to enter the aqueduct himself and inspect the interior. He expects to be able to report upon the whole subject in April. Mr. Hawksley is a busy man. I see that he was back in London on Thursday, presiding, as Oversman, at the arbitration regarding the transfer of the Airdrie and Coatbridge water undertaking to the Corporations of the two places.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 15.

Sulphate of Ammonia.

The severe weather has checked direct demand, and the market has become quieter in consequence; but requirements for covering purposes have been sufficient to absorb current production, and prices have been about maintained. The closing quotations are £11 7s. 6d. per ton f.o.b. Hull, and £11 10s. per ton f.o.b. Leith and Liverpool. There has been a certain amount of second-hand selling at a shade under makers' prices; but this has not materially affected the position. In the forward position, makers remain firm at £11 10s. per ton, ordinary terms, f.o.b. Leith, delivery over the spring months, and at £11 10s. per ton, Beckton terms, London, delivery over the same period; but buyers have not responded. For May-September delivery, however, £11 5s. per ton f.o.b. Leith, has been paid, ordinary terms.

Nitrate of Soda.

The strike at Iquique having been settled, the nitrate of soda market is rather quieter; but prices have not been materially altered. The spot price is 10s. 3d. per cwt. *ex* store.

LONDON, *Feb.* 15.

Tar Products.

There is very little doing; and, as a rule, all the articles are quiet, with the exception of pitch, for which there is a very strong demand indeed for shipment from London. It is reported that very high prices would have been paid for immediate shipment had makers had any available. Further business has been done for October-December next; while it is reported that contracts are in course of being negotiated for January-June, 1903. 90 per cent. benzol is very dull indeed. Further sales are reported at 9½d. February-June. As regards 50-90 per cent., an offer of 8d. February-June was declined by manufacturers, who, however, would have accepted 8⅝d. for prompt delivery. Creosote continues dull; and prices remain stationary, with, if anything, a slightly downward tendency. In carbolic crystals, sales of 39-40's are reported at very low prices, as there is little or no demand for this quality. In 34-35's orders are still coming forward at about 6½d. per pound for shipment from London; but the demand is rather limited. Crude carbolic is better. Sales are reported at 1s. 10d. at outports, February-March delivery. In fact, one London distiller reports sales at a little over this. Toluol is in a very depressed condition. Business is reported in ordinary at under 1cd., while sales of pure have been made at 1s. 1d. prompt delivery. Solvent is offering freely for export at 10d., shipment from outports; but better prices are to be had in London for fine quality.

The average values obtaining during the week are: Tar, 16s. to 19s. Pitch, east coast, 37s. to 38s.; London, 39s. to 39s. 6d.; west coast, 34s. 6d. to 35s. Benzol, 90's, 9½d.; 50's, 8d. to 8½d. Toluol, 9d. to 10d. Crude naphtha, 3¾d. to 4d.; solvent naphtha, 10d. to 11d.; heavy naphtha, 10d. Creosote, London, 1⅝d.; North, 1d. to 1 1/16d. Heavy oils, 2d. to 2⅛d. Carbolic acid, 60's, 1s. 10d. Naphthalene, 45s. to 65s.; salts, 22s. 6d. to 27s. 6d. Anthracene, "A," 1¾d. to 2d.; "B," 1d.

Sulphate of Ammonia.

The market remains very firm, with a fairly good demand. Beckton are still sellers at £11 10s. February-June. This price was accepted for prompt delivery by another London Gas Company, but on their own special terms. Business has been done in Hull at £11 8s. 9d. for fine makes, prompt shipment, while £11 10s. is quoted for March-June. In Leith, makers still ask £11 10s. in any position; and it is reported that small sales have been made at this price. As regards Liverpool, there is a very good demand for prompt delivery, and business is reported at £11 12s. 6d. by one large manufacturer for early shipment.

COAL TRADE REPORTS.

Lancashire Coal Trade.

For all descriptions of round coal there is still an active inquiry, owing to the continued severity of the weather; and pits have been kept on full time, with here and there stocks which are already exceedingly small, being called upon to meet requirements. Any pressure, however, is entirely for house-fire qualities; and this is not as great as might have been expected, owing to the conditions just now prevailing. The position, however, is that there is a depletion of stocks at the collieries; and this will no doubt hold in check any downward move in prices that might otherwise have come immediately after the close of the winter's demand. For the better qualities of round coal, pit prices remain firm at 15s. to 15s. 6d. per ton for best Wigan Arley, 13s. to 13s. 6d. for Pemberton four-feet and seconds Arley, and 11s. to

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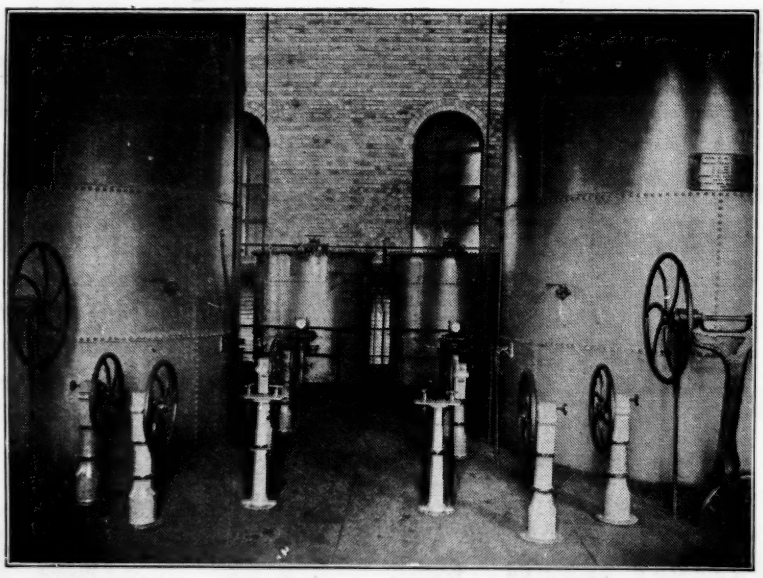

RESULTS PROVE EFFICIENCY.

Working Floor of Generator House. One-Fifth Section of Birmingham Plant, Windsor Street Station.
The Maximum Daily Capacity of the Birmingham Corporation's Plant, which was erected by this Company, is 12 MILLION CUBIC FEET.

11s. 6d. for common house coal. The lower descriptions of round coal, which have been considerably drawn upon for common house-fire consumption, are, as a result, not over-plentiful for steam and forge requirements; and though the demand for iron-making and general manufacturing purposes is not more than moderate, collieries have no surplus, and are able to maintain prices firmly at about late rates. These average 9s. per ton for good qualities of steam and forge coal. Of engine classes of fuel supplies continue ample on the market, with commoner sorts in some outside districts quite a drug. This, of course, is largely due to the increased quantity of round coal that has been screened recently for house-fire purposes; and from Derbyshire especially, where there is no local market for engine fuel, the output of slack has to be pressed for sale in other districts. For the best qualities of Lancashire slack, however, coalowners have no difficulty in finding a sale, and in maintaining prices—ranging from 6s. 6d. per ton for good medium to 7s. for best qualities. The competition from other districts, however, is weakening the position with regard to the lower descriptions of engine fuel, and concessions have here and there to be made where local trade is attacked from outside; but the general quoted prices remain at about 5s. to 5s. 6d. per ton at the pit. The shipping demand is fairly good; and with only limited supplies offering, owing to the better inland prices now obtainable for common round coals, rates for delivery at the Mersey ports are generally maintained at about 10s. 6d. to 11s. per ton. Coke makers in Lancashire report a satisfactory demand for both furnace and foundry qualities, and prices remain at about 22s. to 24s. for best foundry cokes, and 13s. to 14s. for best washed furnace cokes, at the ovens.

Northern Coal Trade.

The coal trade of the North is still very dull, but unequally so; the demand for one or two classes being about an average for this season of the year. There is, however, a supply that is generally abundant, and hence the range of prices is dull; while in one or two cases, collieries are not able to obtain full work for the pits. Naturally, this has had an effect on the prices; and the quotations are occasionally lower. Best Northumbrian steam coals are from 10s. 6d. to 11s. per ton f.o.b., unscreened steams are 8s. 3d., and steam smalls are from 4s. 6d. to 4s. 9d. In the gas coal trade, the tendency is towards ease; but there is still a heavy general demand, and the collieries have had full work in most cases. Gas coals are now generally quoted at from 10s. to 10s. 6d. per ton f.o.b., according to quality. Contracts are not numerous in the market at present; and buyers seem inclined to hold off, though it is to be remembered that the waiting policy last year proved to be the worse. Coke is quieter, the general use being less. Best Durham coke for export is about 17s. per ton f.o.b. Blast furnace coke is from 15s. 3d. to 15s. 6d. per ton at the Teesside furnaces. Gas coke is easier; 9s. 6d. per ton f.o.b. having been quoted on the Newcastle Exchange this week.

Scotch Coal Trade.

Trade is described as steady; but at the same time exports are at present declining, and prices are coming down, though slightly. There is not yet that improvement in business which has long been hoped for; but this is always a dull season in coal. It may have some effect upon future business that the Conciliation Board between masters and men has been continued till May 31. The prices quoted are: Main 9s. to 9s. 3d. per ton f.o.b. Glasgow, ell 10s. 3d. to 10s. 9d., and splint 10s. 6d. to 10s. 9d. The shipments for the week amounted to 156,906 tons—a decrease of 20,015 tons upon the previous week, and of 18,475 tons upon the corresponding week of last year. For the year to date, the total shipments have been 918,209 tons—an increase of 63,809 tons upon the same period of last year.

High-Pressure Gas Light at Leeds.—At the Grocers' and Bakers' Exhibition open the last two weeks at Leeds, the James Keith and Blackman Company, Limited, have had an installation of Keith's system of high-pressure gas-lighting, and have been awarded a diploma and gold medal. On their stand was a card giving an approximate total of the installations they have fixed during the last few months as 4 million candle power, and mentioning as among their clients some of the leading engineering firms and woollen manufacturers in the United Kingdom. Taking gas at 2s. 6d. per 1000 cubic feet, and comparing the low-pressure and the high-pressure gas, they mention that 4 million candle power will cost per hour: On the high-pressure system, £16 13s. 4d.; on the low-pressure system, £108 6s. 8d. These figures, they contend, are sufficient to make manufacturers look carefully at their gas bills, as in many cases these could be reduced by more than one-half by adopting the high-pressure system of gas consumption.

Fatal Accident at the Ely Gas-Works.—On Monday, the 10th inst., a sad accident occurred at the works of the Ely Gas Company, where Messrs. Clayton, Son, and Co., Limited, are erecting a telescopic gasholder and steel tank, 64 feet diameter by 20 feet deep, standing some 16 feet out of the ground. The tank, framework, and inner lift had been completed, and the outer lift was in course of erection. One of Messrs. Clayton's employees, John Aldershaw, of Leeds, was standing on a low stage placed on the platform at the top of the tank, hauling up rivets, when by some means he lost his balance and fell to the ground, a distance of about 18 feet, striking the back of his head on a 10-inch pipe, and fracturing the base of the skull. He was immediately attended to, and removed to the Union Infirmary under medical supervision; but he never regained consciousness, and expired about 5 p.m. the same day. At the inquest on Wednesday, a verdict of death from misadventure was returned; no blame being attributed to anyone. Mr. T. A. Guyatt, Engineer and Secretary to the Company, attended, and expressed, on behalf of his Directors and himself, his very great regret at the unfortunate occurrence, and their sympathy with the relatives of the deceased. He also read a letter he had received from Messrs. Clayton, expressing similar sentiments. The unfortunate man was 47 years of age, and had been in the employ of the firm for about 17 years. He leaves a widow, but no family.

TEST MATCH.

Gas v. Coal

STOVES RANGES.

George Glover's began batting - 1861
George Newton's, went in - - - 1862
Staples, c. Glover b Richmond - 1881
Richmond's, started scoring - - 1889

Present score 1902 not out.

[Advertisement of The Richmond Gas Stove and Meter Co., Ltd.]

Reductions in Price.—The price of gas at Shanklin is to be reduced from 4s. 2d. to 3s. 11d. per 1000 cubic feet on the 30th of June. As from the 1st of July next, the price of gas at Ipswich will be 2s. 8d. instead of 2s. 10d. per 1000 cubic feet to ordinary consumers. A reduction of 6d. per 1000 cubic feet by the South Hylton Gas Company brings the price down to 4s. 6d., with a discount of 9d. for prompt payment.

The Supposed Case of Gas Poisoning at Coatbridge.—In the "JOURNAL" for the 4th inst., we recorded the death of a domestic servant at Coatbridge from gas poisoning, as was supposed. According to the report which reached us, the girl was found in an insensible condition; the room being full of gas, and the tap of a stove only half closed. We have since learnt that a gas-bracket was alight all night in the girl's bedroom. It is therefore surprising that an explosion did not occur before a sufficient quantity of gas to cause asphyxiation had accumulated.

Sales of Shares.—Last Tuesday Mr. Alfred Richards sold, at the Mart, Tokenhouse Yard, E.C., by order of the Directors, 500 £10 "A" shares in the Tendring Hundred Water-Works Company. They ranked for a dividend of 8 per cent.; the last having been at the rate of 4½ per cent. per annum. They were all sold at par. Some original £5 shares in the West Ham Gas Company (last dividend 9 per cent.) fetched £10 apiece; and some new ordinary £10 shares (last dividend 6 per cent.), £13 5s. each. A few original £10 shares in the West Kent Gas Company were sold by order of executors, and fetched from £18 2s. 6d. to £19 per share. On Thursday last, Mr. J. W. Crosby offered for sale by auction, at the offices of the Hartlepool Gas and Water Company, £10,000 of the Company's 5 per cent. maximum ordinary stock, at prices ranging from £125 to £125 15s. per £100 of stock.

Mr. Percy Griffith on the Illuminating v. Calorific Power of Gas.—Referring to the remarks made by Mr. Percy Griffith, M.Inst.C.E., in his Society of Engineers address, on the prospect of the illuminating quality of gas being ultimately subordinated to the calorific power, and the consequent reduction in cost of manufacture, the "Coventry Herald" says: "A Birmingham expert with whom a 'Midland Express' representative has had a conversation, did not agree that there was a likelihood of any such possibility as that predicted. So long as gas remained cheaper than electricity, he thought it would continue to be extensively used for lighting purposes. While it was true that a low-grade gas could be used for heating purposes, it was, in the end, very little cheaper to produce, because a larger quantity of the low-grade gas was necessary to obtain the same results. It was pointed out to the representative that, by the use of incandescent burners, an efficient light could be obtained with low-grade gas at a cheaper cost of production; but the incandescent burners were not always favoured by the public, owing to the extra trouble involved. Therefore, he did not anticipate that in the future incandescent burners would be substituted for the ordinary ones, and low-grade gas supplied at proportionately reduced rates."

Gas Supply at Schoeneberg.—The new contract between the Imperial Continental Gas Association and the Municipality of Schoeneberg, near Berlin, is to be settled at the next meeting of the Magistrates The concession is to be extended for 20 years, and the erection of municipal gas-works will consequently be abandoned. By adopting a sliding-scale, the Association are, it appears, willing to grant, at the present price of about 3s 6d. per 1000 cubic feet, 9·46 per cent. of the gross receipts, which will come to about 210,000 marks. If the price is reduced, the amount will be less; and at the price of 3s. 3d. it would be only 2½ per cent. The lighting of the streets free of cost means the supply of 1022 lamps, which were existing on Dec. 31, 1901, for the term the contract lasts. For each additional lamp, the Town Council will pay 60 marks (£3) per annum.

Margate Water Supply.—A poll of the owners and ratepayers of Margate has been taken on the proposal of the Town Council to promote a Bill in Parliament for powers to carry out a scheme of water supply. Considerable sums have been spent in attempts to procure more water in the locality; and finally the Corporation adopted a scheme devised by the Borough Engineer (Mr. Albert Latham) to obtain a supply from the hills in the district of Wingham, 14 miles from Margate. The scheme is estimated to cost £90,000. But the Corporation have agreed, in order to avoid opposition, to supply 15 parishes in in the district; and powers are sought in the Bill to borrow £120,000. There has been considerable opposition to the scheme in Margate, on the ground of cost; but all the medical practitioners in the town are strongly in favour of it. The voting papers were collected on the 7th inst., and the counting took place next day. More than 3000 votes were recorded in favour of the proposal, and 1700 against it.

Gas-Testing at Aldershot.—Under the provisions of the Aldershot Gas and Water Act of last session, a gas-testing station had to be provided at the Council's offices, at the public expense. This has lately been done, and the apparatus was inspected on the 7th inst, by Mr. E. H. Stevenson, who, it may be remembered, is the adviser of the Council. The Secretary of the Gas and Water Company (Mr. R. W. Edwards) and the Engineer (Mr. G. P. Lewis) were in attendance. In the presence of nearly all the councillors, Mr. Stevenson tested the apparatus, and passed it as satisfactory. The parties then entered the Council Chamber, when Mr. Stevenson explained that a tester would have to be appointed, and that the Company would be entitled to make tests of the gas. It would not be advisable to lay down any hard-and-fast rule as to the testing. The Council could, however, inform the Company when they intended to make the test, and then they could send a representative if they cared to do so. It would be impossible to alter the quality of the gas in five minutes. If they were supplying bad gas, they would not be able to purify it in less than three or four hours; and it would be impossible, too, to alter the illuminating power before the test could be made. A test carried out by the Council's tester would be considered official, and would not need confirmation. Judging by the remarks made, a more amicable feeling will prevail between the Council and the Company in future.

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Water-Works for Rothwell.—On Monday last week, the Chairman of the Rothwell District Council (Mr. F. Barlow) cut the first turf on the site for the reservoir in connection with the scheme which the Council are carrying out to supply the district with water. He was presented with a handsome silver spade, suitably inscribed, wherewith to perform the ceremony.

Carburetted Water-Gas Plant for Mitcham.—We learn that the Mitcham and Wimbledon District Gas Company have decided to put down a carburetted water-gas plant, and have accepted the designs and tender of Messrs. S. Cutler and Sons for the work. The plant is to be in two sections, each of 500,000 cubic feet per day capacity, and generally on similar lines to that recently erected by the same firm for the Oldham Corporation, which was described in the "JOURNAL" for the 28th ult.

Strikes on the Continent.—A telegram from Rome says the workmen in the service of the two Turin Gas Companies lately declared a general strike for an increase of wages; and for several nights the city was in darkness. About 2000 men were employed as torch-bearers. Telegraphing last Friday, the Vienna correspondent of the "Daily Telegraph" communicated the news that a strike took place on Thursday at the Trieste works of the Austrian-Lloyd Steam Navigation Company; and on Friday the strikers were joined by the gas workers and the employees of nearly all the other factories in the town. Altogether about 200,000 men left their work. In consequence of the threatening attitude assumed by the strikers, all the shops were closed, and the public buildings guarded by soldiers. This, however, did not prevent the men breaking the windows of the municipal offices with stones.

Wrexham Water Bill.—A special meeting of the Wrexham Water Company was held on Tuesday last, for the purpose of considering the Bill which has been introduced by the Company in the present session of Parliament. The Chairman (Mr. W. J. Sisson) explained that the main object of the measure was to provide an abundant supply of water for the ever-increasing wants of the district; but there were also provisions relating to the prevention of fouling of the water. The recent purchases of land for the purpose of enabling the Company to exercise more control of the catchment area were to be confirmed, and further powers in this respect were sought for. Then they asked for additional capital—£48,000 in shares, and £16,000 of loans. Provision had been made for the consolidation of the existing preference shares and stock into one general preference stock bearing interest at 4½ per cent. This consolidation would tend to the financial stability of the Company, and would prevent the inconvenience and confusion arising from a multiplicity of preference charges. The only other provision of note was the intended change of name. The present name of the Company would almost imply that their scope of operations was confined to Wrexham; but having regard to the fact that the Company supplied water in thirty-six parishes, four unions, and three counties, it was deemed advisable to have a name bearing more relation to the wider area. The promotion of the Bill was unanimously agreed to.

Increased Gas Storage for Dorking and St. Albans.—The Dorking Gas Company have just placed a contract with Messrs. S. Cutler and Sons, of Millwall, for a telescopic gasholder, in a steel tank 95 feet diameter, to designs prepared by the Company's Engineer (Mr. Samuel Carpenter). Messrs. Cutler also have in hand, under the direction of Mr. A. F. Phillips, a telescopic gasholder for St. Albans, with guide-framing constructed on Cutler's patent system.

The Geltsdale Water Scheme for Carlisle.—At the meeting of the Carlisle Town Council last Tuesday, the minutes presented by the Geltsdale Water Committee notified that the Town Clerk (Mr. A. H. Collingwood) had reported that the period of six months during which the Council, at a meeting on the 9th of July last, resolved that the Geltsdale Water Scheme should remain in abeyance had expired. The Committee discussed the question of calling in the services of some well-known water engineer to report and advise upon the scheme, and the further consideration thereof was adjourned to the next meeting. The Mayor (Mr. B. Scott) said there was nothing to report; and the minutes were confirmed without comment.

Alford Gas Company.—The Directors of this small Lincolnshire Gas Company, of which the late Mr. W. Carr was Chairman, have decided to keep up the connection with his family by appointing his brother (Mr. Isaac Carr, of Widnes) his successor; and at the half-yearly general meeting of the Company last Friday, his son (Mr. Harry Carr) was elected to fill the vacancy on the Board. In their report, the Directors acknowledged that the greatly improved position of the Company, both financially and in the better equipment of the works, was almost entirely due to the individual efforts of their deceased colleague. The profits realized allowed of the payment of a dividend at the rate of 5 per cent. per annum, less income-tax. A large bed of retorts was renewed during the half year; and the Manager (Mr. R. Tweddle) reported that the works and plant generally had been well maintained.

Heavy Gas Consumption in Manchester.—Some big figures are published with regard to the output by the Manchester Corporation Gas Department during the recent prolonged period of fog. The largest day consumption ever recorded by the department was on Dec. 27, 1899, when it reached 26,164,000 cubic feet. During the week ending on the 10th inst., the daily average was 24,000,000 cubic feet, which is a very exceptional figure for this time of the year. The largest consumption ever recorded hitherto between the daytime hours of eight to four, was also on Dec. 27, 1899, and was 10,989,000 cubic feet; but on Thursday last this record was beaten with 11,286,000 cubic feet. During January the output from the works was greater than in the corresponding month in any previous year. In January, 1901, the quantity was 586,468,000 cubic feet; while in the first month of the present year there was consumed 597,000,000 cubic feet, or an increase of 1½ per cent. During the week ended the 13th inst., 143,743,000 cubic feet of gas were consumed, as compared with 126,462,000 cubic feet in February, 1901, or an increase of 13·66 per cent. To keep the gas-works going at a time like the present, there is a daily carbonization of coal and cannel to the amount of 25,000 tons.

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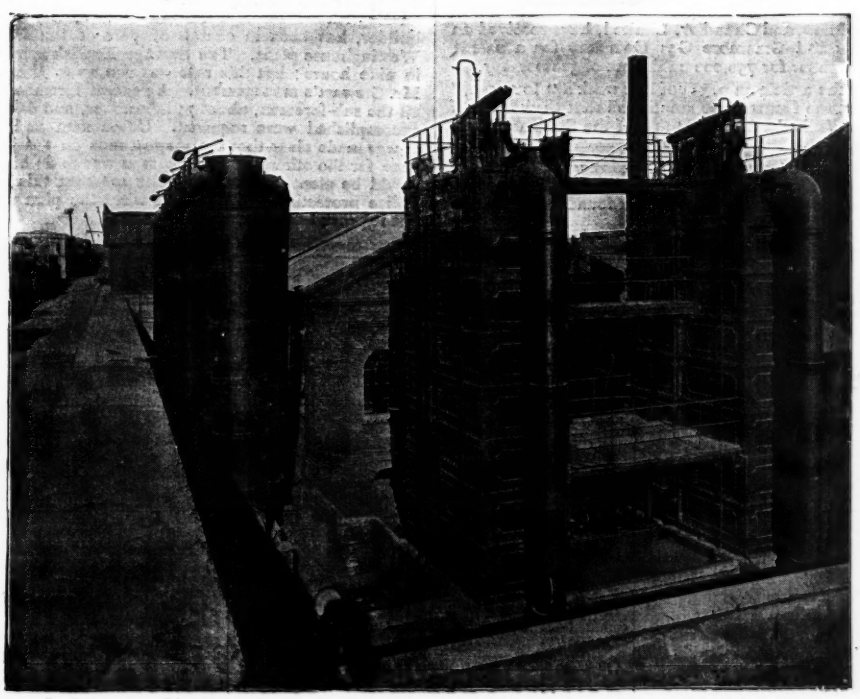

THE ANNULAR CONDENSER FITTED WITH WATER COOLING ARRANGEMENT COOLS DOWN THE GAS TO THE WATER TEMPERATURE IN THIS HOT CLIMATE.

WALKER'S PATENT CONDENSER AND PURIFYING-MACHINE AT SANTIAGO GAS-WORKS.

Llandrindod Water Arbitration Award.—Sir George B. Bruce, the Umpire in this arbitration, the proceedings in which were reported in the "JOURNAL" for the 28th ult. (p. 226), has made his award. The Llandrindod Wells Water Company valued their property at £23,672; and the Umpire has given them £13,820—no order being made as to costs.

A Gas-Works Seized for Debt.—An incident which is fortunately not common in the gas industry has occurred at Bardon, where the gas-works (which are the property of the Town Commissioners) have been seized by the Sheriff for a judgment debt. The amount of the claim is stated to be £450; and the Commissioners are at present unable to pay the money. The works were to be sold yesterday.

Compensation Water Question.—Under the provisions of the Newcastle and Gateshead Water Act, 1894, Mr. G. H. Hill and the late Mr. G. J. Symons, were appointed Arbitrators for the purpose of ascertaining the amount of available rainfall, so as to fix the compensation water to be discharged by the Newcastle and Gateshead Water Company into the River Rede, as in section 13 of the Act particularly mentioned. Owing to the death of Mr. Symons, Mr. H. S. Wallis was appointed Arbitrator in his stead by the President of the Institution of Civil Engineers. The Arbitrators have decided that the amount of the available rainfall upon the drainage area of the Catcleugh reservoir, in the Act mentioned, is 19¾ inches.

Shrewsbury Water Supply.—The Shrewsbury Water Committee have instructed the Borough Engineer to make a preliminary investigation with regard to the practicability of carrying out a new water supply scheme for the town which was referred to in Mr. Baldwin Latham's report to the Council as long ago as 1889 (called the Castle Pulverbatch scheme); and the Medical Officer of Health has been asked to ascertain the quality of the water and the condition of the source from which it is derived. The Committee point out that the question of providing a fresh water supply for the town is of the gravest importance; the present conditions being most unsatisfactory and precarious. If the scheme alluded to does not prove desirable, the Committee will lose no time in formulating another.

A Valuable Spring.—Among the extracts in yesterday's "Times" from the number for the corresponding day 100 years ago was the following: "The Duke of Bridgewater has just completed a very extraordinary and valuable purchase in Hertfordshire. A small estate belonging to Mr. Whitbread, not far from Hatfield, had been for some time under sale. The original demand for it was £10,000; but, the gentleman not making good his purchase within the limited time, it was again offered for sale, and £11,000 was bid. Some demur took place in respect to the regularity of the title-deeds; and in the meantime several noble competitors started for the purchase of it. The estate was at length bought by the Duke of Bridgewater for £14,000 besides the timber; and we have reason to think it was intended as a present to Lady Sutherland. The Duke, who had profited so much by springs and aqueducts, in walking over the ground, inquired from whence a small rivulet sprang which ran through a part of the premises. The spring was traced, and on investigation was found to be so strong and fruitful that its equal is not known. It struck his Grace that this spring might supply London with water. As soon as the New River Company were made acquainted with the fact, very advantageous proposals were made to the Duke for the spring; and we are confidently assured he has been offered £5000 a year for the rent of it."

To-morrow (Wednesday) has been appointed as the "Special Settlement" day for the shares of the Davis Gas-Stove Company, Limited.

The West Middlesex Water Company are inviting tenders for an issue of £50,000 of 3 per cent. debenture stock, the first half-year's interest on which will be due on Oct. 5.

Messrs. Kirkham, Hulett, and Chandler, Limited, have received an order from the Harrow and Stanmore Gas Company for a patent "Standard" washer-scrubber for 750,000 cubic feet of gas per day.

As an addendum to the article on p. 364 of last week's "JOURNAL," *re* incandescent lighting, the fact may be mentioned that the system of lighting adopted in the Willesden district is that of the Simmance and Abady patent torch.

Owing to a stoppage in the gas-mains last Sunday week, the village of Wellesbourne, Warwick, was plunged in darkness. Great inconvenience was caused to the inhabitants, as it was found impossible to put matters right for two or three days.

Nineteen tenders were received by the Paignton District Council for the main in connection with the new Dartmoor water supply. The amounts ranged from £55,399 to £33,027. The lowest tender—that of Messrs. Grisenthwaite and Newton, of Carlisle, was the one which was accepted.

The Directors of the Gas, Water, and General Investment Trust, Limited, recommend dividends for the half-year ended Jan. 28 at the rates of 4½ per cent. per annum on the preferred stock, and 6 per cent. per annum on the deferred stock; making for the year 4½ and 4 per cent. respectively.

Messrs. R. Dempster and Sons, Limited, of Elland, have received the second repeat order for four through arches of their regenerator retorts, complete with all ironwork, for the Great Western Railway Company's Swindon works. This will make a third block of four arches which have been erected by the firm.

The Devonport Borough Council Finance Committee have decided that the gas-meter indices shall be taken half-quarterly, and that the collection of the gas and general rates of the borough shall be amalgamated. The question of the amalgamation of the collections was referred to the Committee last month (*ante*, p. 101).

Last week, a large main in Bridlington broke, and about 200,000 cubic feet of gas escaped. Two employees of the Gas Company were rendered unconscious in attempting to repair the break. It is supposed that subsidence of earth in connection with the carrying out of the main-drainage scheme in the district caused the fracture.

Reference has been made at various times in the "JOURNAL" to the dearth of coppers caused by the extensive use of penny-in-the-slot gas-meters and other automatic supply machines. The "Ironmonger" suggests that gas companies or other trading concerns should offer to exchange coppers for silver or gold on the application of local tradesmen.

Mr. Alfred Richards's forthcoming sales include £10,000 of ordinary "C" stock and £9000 of 3 per cent. perpetual debenture stock of the Wandsworth and Putney Gas Company, also 400 ordinary £10 shares and £1500 of 4 per cent. perpetual debenture stock of the Lowestoft Water and Gas Company, on the 25th inst.; and 300 £10 "C" shares of the Harrow and Stanmore Gas Company on the 4th prox.

A recent decision of the Elder Brethren of the Trinity House will be hailed with satisfaction by sailors throughout the world. The Manacle Rocks, off Falmouth, are one of the worst death-traps on the English coast. Notwithstanding this, their position has hitherto been marked by a bell-buoy only. In future a gas-lighted buoy will flash warning to navigators, and disasters similar to that which befell the *Mohegan* thereby rendered far less likely.

The annual dinner to the employees of the Shanklin Gas Company took place on the 6th inst., under the presidency of Mr. R. Young. The toast of "Success to the Shanklin Gas Company" was enthusiastically honoured. The Engineer and Secretary (Mr. F. C. Taylor) was prevented by illness from being present; but a toast in which his name was coupled with the members of the staff was proposed in complimentary terms by the Chairman, and heartily received.

A beautifully prepared catalogue has just been issued from the Public Lighting Department of the Welsbach Incandescent Gas-Light Company. It is well illustrated, and contains numerous patterns of lanterns on the self-intensifying and ordinary principles of incandescent lighting, and for single burners and clusters. There is a good choice of designs, some of which are really ornate in character. Burners fitted with the Company's anti-vibrator and lighting arrangements are also illustrated; and it is seen that, where the constantly burning bye-pass is objected to, Simmance and Abady's patent torch is suggested for adoption.

We learn from the "Engineering Record" that an American contractor has accomplished the hitherto impossible feat of making an English bricklayer work properly. Mr. J. C. Stewart, a St. Louis builder, has been in charge of part of the erection of the British Westinghouse plant. The average English bricklayer lays 500 bricks in nine hours; but this rate was run up to from 1800 to 2500 under Mr. Stewart's management. A general foreman was put in charge of all the sub-foremen, about 75 in number, and daily reports of the work accomplished were required. Union men and rules were adopted. It was made clear that the slowest man on the job was not to set the pace for the others—that each man was to do his best, and that there would be plenty of men about to see that this idea was carried out. Police protection was provided when the plan was first inaugurated; but it proved unnecessary.

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